AMATEUR RADIO

JUNE 1993
Volume 61 No 6

Journal of the Wireless Institute of Australia

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- Unwanted Strays — Signals or Noise?
- PK 232 Controller Upgrade

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AMATEUR RADIO

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CONTENTS

Cover

The neat shack of husband and wife amateur radio operators Judi Fell VK2ELF and Adrian Fell VK2DZF. Over the years, Judi and Adrian have suffered more than their fair share of problems and interference in the orderly establishing of their amateur radio station. Refer to page 6 for the absorbing and humorous story "Spies, Radio Branch and Neighbours".

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigation carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Wireless Institute of Australia

The world's first and oldest National Radio Society Founded 1910

Representing the Australian Amateur Radio Service
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FEDERAL QSP

This is my first contribution to the Editorial column since taking over as Federal President of the WIA following the death of Ron Henderson. I must admit that I approach the job, both the writing and the President's duties, with some trepidation. Ron, and all those who have held the job before him, have provided a very hard act to follow. I hope I can continue the tradition. In developing this editorial I thought I would touch on a subject that I know was of interest to Ron as well as myself — the perceptions that surround the various classes of licences.

In the beginning there was the Full Call and all were considered equal although, with time, the two letter calls became especially sought after by some as though they provided some form of status. Then came the Limited class of licence, matching the Full Call in theory and regulations, but lacking the Morse code requirement. Limited licensees were seen as being VHF and UHF nuts, delving into esoteric theory and practice and playing in areas where many Full Calls feared to tread. Next came the Novice class of licence with a lesser theory and Morse requirement, but the same regulations exam as the existing two licence classes. Finally the Combined Novice and Limited class appeared for those who could handle the higher level of theory but only the slower Morse exams. When (rather than if — I'm an optimist on that front) the new amateur licensing conditions are introduced, there will be a fifth class, the Novice Limited.

Continued page 5

Publisher's Comment

Articles

The WIA is always on the lookout for technical and topical general interest articles from members. However, at present, the supply of articles ready for publication in your magazine is quite low and the need for new articles of all types is greater than it has been for several years.

The rewards for contributing authors? Personal gratification in making a tangible contribution to your hobby by sharing your technical and operating experiences with other members, publication in Australia's own prestigious amateur journal and, in many instances, world wide exposure in overseas amateur magazines.

Please see the August 1992 issue of Amateur Radio magazine, page 18, for information on writing an article for your magazine, or forward a request to Amateur Radio Magazine, PO Box 300, Caulfield South, VIC, 3162 for a copy of that information.

The editors also require photographs (suitable for the cover as well), and small "filler" type items, such as cartoons, hints and kinks, and "Try This".

The WIA needs your help to keep your magazine full of interesting articles. I look forward to a flood of articles.

Bill Roper VK3ARZ
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POSITIONS VACANT

(2 positions)

Following the resignation of the General Manager of the Federal Office of the WIA, Council has decided to create two new positions which are now vacant.

Applications are called for the positions of Secretary (part time position) and Office Manager (part time or full time position).

Company Secretary The Company Secretary is a non voting member of the Federal Council and is responsible for the smooth and efficient operation of all administrative functions of the Council.

Office Manager The Office Manager is responsible for the efficient operation of the Federal Office in Melbourne, including the management of the staff, examinations service, production of *Amateur Radio* magazine and administrative services to the Divisions.

Salary for both positions will be determined by negotiation.

For further information please contact Bill Roper at the Federal Office on 528 5962.

Applications for the positions should be addressed to the

WIA Selection Committee
PO Box 948
Civic Square ACT 2608

Applications will close at 5 pm on Monday 21st June 1993.

The WIA is an equal opportunity employer and all applications will be treated in the strictest confidence.

WIA Divisions

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually their residential State or Territory, and each Division looks after amateur radio affairs within their State.

Division	Address	Officers			Weekly News Broadcasts		1993 Fees
VK1	ACT Division GPO Box 600 Canberra ACT 2601 Phone (06) 247 7006	President Secretary Treasurer	Christopher Davis Hugh Blemings Don Hume	VK1DO VK1YYZ VK1DH	3.570 MHz LSB, 146.950 MHz FM, 438.525 MHz FM each Monday evening (except the fourth Monday) commencing at 8.00 pm. Repeated on Wednesday evening at 8.00 pm on 146.950 MHz FM.	(F) (G) (S) (X)	$70.00 $56.00 $42.00
VK2	NSW Division 109 Wigram Street Parramatta NSW (PO Box 1066 Parramatta 2124) Phone (02) 689 2417 Fax (02) 633 1525	President Secretary Treasurer (Office hours	Terry Ryeland Bob Lloyd Jones Bob Taylor Mon-Fri 11.00-14.00 Wed 1900-2100)	VK2UX VK2YEL VK2AOE	From VK2WI 1.845, 3.595, 7.146*, 10.125, 24,950, 28.320, 52.120, 52.525, 144.120, 147.000, 438.525, 1281.750 (*morning only) with relays to some of 14.160, 18.120, 21.170, 584.750 ATV sound. Many country regions relay via a local 2 metre repeater. Sunday 1000 and 1915. Highlights included in VK2AWX Newcastle Monday 1930 on 3.593 plus 10mx, 2mx, 70cm, 23cm. News headlines by phone (02) 552 5188. Some broadcast text can be found on the Packet network.	(F) (G) (S) (X)	$65.75 $53.40 $38.75
VK3	Victorian Division 40G Victory Boulevard Ashburton Vic 3147 Phone (03) 885 9261	President Secretary Treasurer Office hours	Jim Linton Barry Wilton Rob Hailey Tue & Thur 0830-1530	VK3PC VK3XV VK3XLV	1.840MHz AM, 3.615 SSB, 7.085 SSB, 53.900 FM(R) Mt Dandenong, 146.700 FM(R) Mt Dandenong, 146.800 FM(R) Mildura, 146.900 FM(R) Swan Hill, 147.225 FM(R) Mt Baw Baw, 147.250 FM(R) Mt Macedon, 438.075 FM(R) Mt St Leonard 1030 hrs on Sunday.	(F) (G) (S) (X)	$72.00 $58.00 $44.00
VK4	Queensland Division GPO Box 638 Brisbane QLD 4001 Phone (07) 284 9075	President Secretary Treasurer	Ross Marren Lance Bickford David Travis	VK4AMJ VK4ZAZ VK4ATR	1.825, 3.065, 7.118, 10.135, 14.342, 18.132, 21.175, 24.970, 28.400 MHz. 52.525 regional 2m repeaters and 1296.100 0900 hrs Sunday. Repeated on 3.605 & 147.150 MHz, 1930 Monday	(F) (G) (S) (X)	$70.00 $56.00 $42.00
VK5	South Australian Division 34 West Thebarton Road Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 352 3426	President Secretary Treasurer	Bob Allan Maurie Hooper Bill Wardrop	VK5BJA VK5EA VK5AWM	1820 kHz 3.550 MHz, 7.095, 14.175, 28.470, 53.100, 145.000 147.000 FM(R) Adelaide, 146.700 FM(R) Mid North,(146.900 FM(R) South East, ATV Ch 34 579.000 Adelaide, ATV 444.250 Mid North Barossa Valley 146.825, 438.425 (NT) 3.555m 146.5000, 0900 hrs Sunday	(F) (G) (S) (X)	$70.00 $56.00 $42.00
VK6	West Australian Division PO Box 10 West Perth WA 6872 Phone (09) 388 3888	President Secretary Treasurer	Cliff Bastin Bruce Hedland-Thomas	VK6LZ VK6OO	146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 3.560, 7.075, 14.115, 14.175, 21.185, 28.345, 50.150, 438.525 MHz. Country relays 3.582, 147.350(R) Busselton 146.900(R) Mt William (Bunbury) 147.225(R), 147.250(R) Mt Saddleback 146.725(R) Albany 146.825(R) Mt Barker broadcast repeated on 146.700 at 1900 hrs.	(F) (G) (S) (X)	$60.75 $46.60 $32.75
VK7	Tasmanian Division 148 Derwent Avenue Lindisfarne TAS 7015 Phone (002) 43 8435	President Secretary Treasurer	Andrew Dixon Ted Beard Peter King	VK7GL VK7EB VK7ZPK	146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.750 (VK7RNW), 3.570, 7.090, 14.130, 52.100, 144.100 (Hobart) Repeated Tues 3.590 at 1930 hrs	(F) (G) (S) (X)	$87.00 $53.65 $39.00
VK8	(Northern Territory is part of the VK5 Division and relays broadcasts from VK5 as shown received on 14 or 28 MHz).						

Note: All times are local. All frequencies MHz.

Membership Grades
Full (F) Pension (G)
Needy (G) Student (S)
Non receipt of AR (X)

Three-year membership available to *Australian resident* (F) (G) (X) grades at fee x 3 times.

Late WIA President — an Obituary

The funeral service for Ron Henderson, attended by several hundred people, was held in the chapel at Duntroon Military College in Canberra on 30 April 1993. The immediate past Federal President, Peter Gamble VK3YRP, and the Federal General Manager and Secretary Bill Roper VK3ARZ, attended, together with many local VK1 WIA members. The eulogy was in two parts; the first part being delivered by Brigadier J G Hughes AM, concentrating on Ron's military and scientific career, and the second being presented by Rob Apathy VK1KRA, vice-chairman of the WIA Federal Council.

This is what Rob said:

Ron Henderson was a ham.

Ham is a term used to refer to people whose hobby is amateur radio, and Ron's interest in the hobby goes back a long way.

Ron brought to the hobby of amateur radio his unique brand of all-embracing enthusiasm, meticulously setting the highest examples of technical ability, a warm and gentlemanly manner while talking on air, and a ceaseless dedication of introducing newcomers to the hobby.

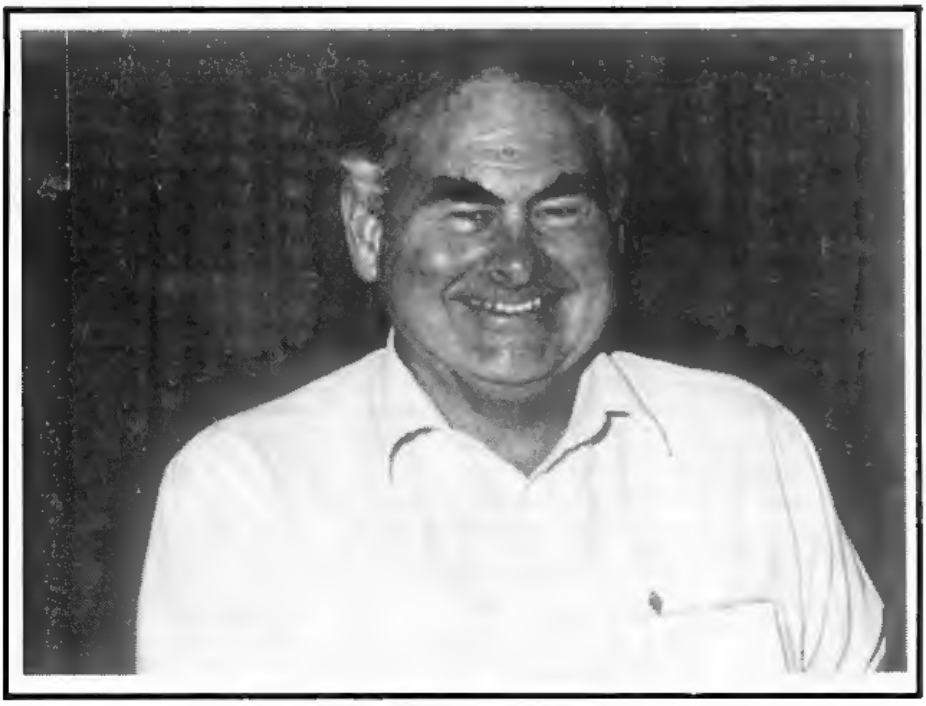
This is how I came to meet Ron, now almost 20 years ago, as he became my friend and my teacher.

His own interest in radios began at the age of nine or 10 when, following the lead of many young radio experimenters, he built his own simple crystal set.

Little would he have realised that such a simple project would lead to a lifetime passion that was part, not only of his hobby, but his career as well. He gave generously of his considerable natural abilities as an organiser, diplomat, arbitrator and tireless motivator of others, and above all a very good friend to all those whom he met.

His interest in radio drew him to the Wireless Institute of Australia, which he joined at the age of 16 — a full two years before he gained his qualifications in 1954.

Ron's curiosity and interest designing and building his own equipment — some of which still sits in his shack after years of service — continually demanded more than he could find among the demands of career and family. Yet, despite the pace of life he set for himself, Ron directed much of his energy toward the creation of radio clubs, their organisation and enjoyment.



Locally, Ron took an active interest in the early days of the Canberra Radio Society with its weekly meetings and club activities centred on the clubhouse located within the riverside huts at Barton, alongside what was then the Molonglo River.

Time constraints and unavoidable army moves often prevented him from participating in full in many radio activities or contests, but he was quick to encourage others to participate, often lending equipment and advice to those who had the time but lacked the know-how.

Although Ron played an active role in the organisation of numerous radio clubs, he often chose the less prestigious committee positions, leaving the limelight for others while quietly applying himself in background activities.

Ron's gift as a mediator, diplomat and arbitrator earned him a universal respect and, indeed, reverence. Some people are often heard to say in a time of adversity they intend to call in some favours. If Ron had chosen to call in the favours he had done for others he would have been deluged. However, such an action was not his style, nor was it necessary. So strong was the respect of his fellow hobbyists for Ron's own loyalty and sense of service that his role was often that of a silent lobbyist, with people stepping forward at Ron's most subtle behest.

After serving on the local committee of the Wireless Institute in numerous positions, including vice president, alternative federal councillor and federal councillor, it was a natural progression to be appointed to the Federal Executive during 1984.

During his time on the Federal Executive, Ron served as a delegate to the World Administrative Radio Conferences where the long-term future of amateur radio as a hobby is essentially determined.

Ron's talent in coping in this international forum has helped to secure the provision of frequencies and operating privileges for both Australian and international radio amateurs at a time when the commercial pressures have reached breaking point. His work in the field of international frequency allocation has

earned him the highest regard from senior officers and government officials alike.

The past few years have seen the successful restructuring of the Federal Executive of the Wireless Institute, with Ron being an instrumental agent in this mammoth task. He was elected president of the new Executive, meaning essentially that he was chairman of a company representing the interests of 20,000 people within the diverse hobby of amateur radio in Australia.

He was the first president of the WIA to die while holding office.

It is often said that if you need something done, ask a busy man. Ron Henderson was as busy as three men. To contemplate the diversity and magnitude of his involvement in amateur radio is quite beyond the comprehension of even the keenest hobbyist. From his home-built projects to WICEN organisation, from contest operation to the packet group, from work on the international and Federal scene through to housing our beacons — his sense of service was incredible.

At a time when volunteerism is increasingly scarce, Ron Henderson set an impeccable example of dedication to family, service to the community, loyalty to his friends, and a ceaseless demonstration of his love for a hobby by what he could give back.

He was a courageous man and continued with his involvement of Federal matters even during the last periods of his illness. Just a week ago he was preparing papers for the forthcoming Federal Convention.

His courage calls to mind the words of Caesar in Shakespeare's play where he says —

"Cowards die many times before their deaths;
The valiant never taste of death but once.
Of all the wonders that I have yet heard
It seems to me most strange that man should fear;
Seeing that death, a necessary end,
Will come when it will come."

Ham is one term we use in the amateur fraternity — Silent Key is another. It is a term we use when one of our colleagues passes away.

VK1RH is now a Silent Key .....

We say farewell to a mentor, a leader, a teacher, a visionary and, above all, a friend.

Tributes have been received from the IARU and several sister societies.

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WIA News

Good Publicity for Amateurs

Northern NSW amateur, Andy Keir VK2AAK, scored widespread publicity for amateur radio in April with a series of articles in regional country newspapers in stories about his contacts with amateurs aboard the Space Shuttle Discovery.

Andy, an ex-Divisional Councillor and keen satellite enthusiast, made contact with the Discovery via both packet and voice. One article, in the Kempsey-based Macleay Argus paper, carried a large picture of Andy in his shack. It pays to publicise!

Amateur Statistics

As at 31 March, there were 18,222 amateur licenses issued in Australia, according to statistics supplied by the DOTC.

Of these, there were 10,634 unrestricted stations, 2633 Novices, 1538 Combined licensees, 3390 Limited and 27 beacons.

Buried in the statistics, we find 334 amateur repeater licenses, which compares well with 427 CB radio service repeater licenses.

FEDERAL QSP

Continued from Page 2

All classes of licence require a degree of hard work and effort on the part of the licensee in order to pass examinations in radio theory, Morse code and regulations. Some are fortunate and pass their exams easily at the first attempt while others find the going hard and may take several attempts to pass. Any person who has trodden the tortuous path to an amateur licence is worthy of recognition for the hard work and effort they have put into being able to pursue this exciting and interesting hobby. Why then is it that we seem to think of some classes of licence as inferior? How often have you heard someone say "I'm only a Novice licensee", or "I'm only a Limited licensee" as if there was something to apologise for? How often have you heard holders of one class of licence speak of holders of other licence classes in a less than complimentary manner?

We are all radio amateurs, have worked hard to get there, and deserve to be accepted for what we are — assets to the Amateur Radio Service! Every Amateur, no matter what his class of licence, has something to contribute to our hobby. The hobby has so many different aspects and people are so diverse in their interests, especially within the amateur radio arena, that there is more than enough room for us all. If our hobby is to survive the increasing world wide pressures on spectrum space, then the more amateurs there are to speak out whenever our hobby is threatened, the better. We should all be seeking to interest more people in the hobby and encouraging them to get an Amateur Licence, no matter what the class, and welcome them to the hobby we all have in common, Amateur Radio.

Remember, we are all Amateurs together and should work in a spirit of co-operation and harmony to further our hobby and common interest of Amateur Radio.

Kevin Olds VK1OK, Federal President

ar

Spies — Radio Branch and Neighbours!

*Adrian Fell VK2DZF * has experienced perhaps more than a fair share of problems in his (and his XYL's) amateur career. Humorous, too!*

Apart from my early boyhood days of crystal sets with cat's whiskers the first recollection regarding the world of radio frequencies was in the 1960s.

I was just starting to get a real interest in hi-fi at that time and was constructing some solid-state and valve amplifiers for my hobby. One beauty that must get a mention was a valve amplifier that didn't use any output speaker transformer; it was directly coupled to the loudspeaker (800 ohms) via a large value electrolytic capacitor. The circuit came from Radio Television and Hobbies, which is now Electronics Australia.

I was married in 1966, and our first home was in Beecroft NSW; this was half a house for which we were paying $25 rent per week. The other half of this house was occupied by the owners.

My workshop was on the floor! All my construction was done there. Any large projects such as loudspeakers were made in my dad's garage at Castle Hill.

I wanted to be a photographer, but became deeply involved with car radios which I stuck at for 26 years. Don't ask me how, but I did. This is where it all started for me and, despite the purchase of a brand new communications receiver from AWA (CR-6A), I developed no interest for amateur radio until the late 1970s.

The technician for all our repairs was Ivan Huser, who was an amateur radio operator. His friend Barry Wood, who was a rep for our electronic parts, was also an amateur radio operator. I was surrounded by fanatics; I eventually would have to submit! Actually I owe a lot of inspiration to these great men.

Troubles

At one brief stage during my radio stint I decided to build a radio-controlled boat which, of course, required a transmitter. This was step 1, so I finally picked a circuit from an English magazine. The circuit didn't use a crystal and, from memory, it worked in the 27 MHz band. A small receiver was built to suit, and two tone-controlled amplifiers to steer the boat left or right.

The next stage was to test the range of the set-up; this is where my wife got her first taste of being married to a radio fanatic. I decided — well, we both did — that Judi would put the transmitter in an ice-cream container along with a battery. She then could go on long walks around the Beecroft streets. I stayed at home with the receiver where I could monitor the transmissions, dry and cosy.

We worked out some keying codes, consisting of dots and dashes (not Morse) that told me where she was at any stage of the walking trip. That way I knew how much range this little transmitter had.

"..... around this period of 1967, there was a lot of hype in the media about SPIES!"

It was transmitting all right; so well, in fact, that every television set for kilometres was getting massive interference from our tests!

We were oblivious to all this interference and, around this period of 1967, there was a lot of hype in the media about SPIES!

Somebody notified Radio Branch, which came out in force looking for the source of these transmissions. We were unaware of all the fuss! Our testing continued day after day, week after week; this was fun.

One day I got a brainwave and decided to reverse the procedure (yes, I still stayed at home) giving Judi the receiver (it was small enough for her walks. The transmitter was connected to my "out of sight" 100ft (30m) receiver aerial. You can imagine the interference then!

Radio Branch now had a fixed transmission to look for, and eventually came running into our property and banged on the front door. We were very lucky, as our entrance was on the side of the house, and they didn't realise this. All the commotion we heard made us realise it was US they were looking for. Talk about a close shave! Maybe a radio-controlled boat wasn't such a good idea after all.

Did Radio Branch get its revenge many years later? I think so. Read on.

Grown-up problems

Some six years later we moved to Baulkham Hills where we purchased our first house. This was now a place to call home, with our own land, FOR ANTENNAS. I eventually obtained my novice call VK2VLF, and my wife followed with VK2VUF. We both then got the AOCP a little time later.

My main interest was experimentation with antennas, and I tried all the popular varieties. Judi again would often do a lot of on-air testing for me. Eventually I obtained a 65ft (20m) wind-up tower from my friend Ivan, who was now a VK5. I swapped some ATU parts etc for it. The tower arrived from SA, but the freight cost me nothing as there was a mix-up with paper-work. Wow! On this tower I put a HyGain duo-bander. With all my wire antennas off it as well, this was great. Dreamtime stuff, we thought.

Well, we may have thought it was great, but our next-door neighbour did not, so the complaints started coming, and coming. It finally got to the stage where we stopped talking altogether. Then the gossip started in our street about the TVI complaints. It just kept snowballing; we got blamed for everything! Since our tower was in the air, the storms were now attracted to our street! This was getting to paranoia levels. What made it worse was our house was in a cul-de-sac; boy, is that bad news?

18 visits by Radio Branch

There was a quiet period when all seemed to be getting back to normal. Then one day there was a knock on the door: "This is Radio Branch and

Husband and wife ham team, Adrian VK2DZF and Judi VK2VUF/ VK2ELF at their rig.

we want to inspect your equipment." They were angry! Why? Because the neighbours next door said we were SPIES using CB radios.

Can you imagine the stress my wife had to cope with? I was at work at the time.

When RB realised we were a licensed amateur station they calmed down somewhat. But, as this was a complaint, they had to follow it up.

The real reason for our neighbours" complaint was they just wanted to get rid of all those antennas; and us, I guess!

This was only the beginning. The next visit from Radio Branch was for TVI complaints from — yes — the same neighbour. This didn't work either, as our station was clean. But there was some TVI, we got the neighbour some high-pass filters (at our cost) for their many, many TV sets. They had splitters everywhere, and the aerial was one of those stacked dipole arrays.

This harassment continued for ages. In total we had 18 raids from Radio Branch. This finally stopped when we wrote to Radio Branch forbidding them entry to our house. This was at the inspector's suggestion. Radio Branch was being driven mad by these people, along with us, and we even thought of suing "everybody" for harassment. Why we didn't I just don't know.

After that, all went quiet for a while. Wait for it ... !

Council Orders Our Tower Removal

It seemed these people (if I can call them that) decided that if they could not get us via Radio Branch then the local council was the next line of attack.

From memory, we applied twice to install the tower, but I can't remember if that was before or after we put it up. I was determined it was going up, no matter what, so I really didn't care about council. Then came the next war for us; a paper war that lasted another 18 months or so, with our council. Our neighbour used to smirk at us when this was going on; boy did I think some terrible thoughts about revenge.

Finally the letter came from council's solicitor. You have X amount of days to remove the tower, or else! Now, just to complicate things a bit more, council's solicitor was also ours, for many long years. This was a messy affair, but I knew council had erred with its paperwork, so I was going to fight to the end.

We obeyed council's request, and removed the tower, where it lay sadly on the ground, hopefully to fight another day.

I was very determined and confident we could beat council, along with our neighbours, so I called for help with the Land and Environment Court. An on-site inspection was arranged between council, council's solicitor and myself; that is, after all the required paperwork was done.

Guess what? The LaEC inspector was an amateur radio operator, and he informed both council and their solicitor that if it went to court they would lose. We could now re-install our tower and antennas. YIPPEE! WE WON! Guess who was smiling at our neighbours now with BIG smirks.

The things we have to go through to get an antenna in the air so we can enjoy our hobby are at times beyond my comprehension.

We finally pack up and move

As the years passed the family grew to four children, and our house was just not big enough. You can imagine the faces when the For Sale sign went up. Luckily we sold fairly quickly, and moved to Castle Hill where we purchased a brand new house. This had to be turfed. I laid out 500m of ground radials first, before Judi and I turfed the back yard.

We were still in the same shire, so had the same council. And, as we would have had to re-apply for the tower, along with the fact that this was a new subdivision, led me to sell the tower and beam.

This is why I have decided to stick with low visibility wire antennas, and I really don't miss the big YAGI, although my wife still does.

Problems with transceivers

The very first amateur radio HF transceiver I got my hands around was the Yaesu FT 101B. Others I had seen were the FT200 and FTDX 400. Although these rigs were good, I decided to purchase a brand-new Kenwood TS 520S. This rig did a

great job for 13 years until it finally went up in smoke.

I bet all you Yaesu fanatics are saying, "Now! That will teach you." But it really wasn't the 520S' fault because I added a bit. Let me explain.

The final stage developed an intermittent fault that caused the cathode resistor to blow open circuit during transmission. This could happen once a day or a week, or even months apart, and I could never find out why. Although I suspected the valves (6146B), everything was checked and checked, to no avail. It was very frustrating, as it happened only in the middle of a QSO, then BANG! everything went dead. Some way to end a QSO! It was very embarrassing!

One sunny day, in the middle of a QSO, it went bang; I was getting very used to the routine of resistor changes, but this particular time I had used all the correct value resistors. With such experience I became very quick to do the repair, and often I could get back on air and apologise to the other party. This time, however, I had to improvise, so I paralleled up some available resistors to obtain the correct value. I was back on the air, but missed the station I was in QSO with.

"It was very frustrating, as it happened only in the middle of a QSO, then BANG! everything went dead."

Some days, or weeks, later I was in another QSO when this fault appeared again. This time there wasn't any bang, rather a great rush of toxic smoke came pouring out of the 520S, then flames!!

I grabbed the fire extinguisher; it didn't work! I ran into the bathroom, came back with a container of water and threw it all over the rig.

By this time the shack (in the house) was filling with this toxic smoke, and I started to gasp for air. This was getting very serious.

I had pulled out the power plug. The smoke was so bad I had no other option but to get out of the house. I ended up in the back yard looking up, gasping for fresh air, and praying the fire was out. I was lucky. It was!

It was some months before the toxic fume smell left the house, and all our clothes required washing many times. Amateur radio wasn't very popular in our household at that stage.

It was time to get a new transceiver. So, until I made up my mind what I wanted, I purchased a used FT 101 ZD MKII, which a local friend of mine finally bought. After much deliberation I decided on the little ICOM 735, which really does an excellent job.

So there it is, amateur radio in all its glory; the ups and the downs; the stress and the joy; but I still love it! How about you?

Did I have a nervous breakdown? Well, actually I did, in 1990. I wonder if all this drama played its part?

* *PO Box 344 Beulkham Hills 2153*

ar

Upgrades for the PK-232 Multi-Mode Data Controller

*Colin MacKinnon VK2DYM * is impressed with a popular data controller, and now provides excellent detail about its operation, and upgrades.*

The AEA PK-232 Multi-mode Data Controller has been around for a number of years, with over 50,000 in use worldwide, and it is still equal to or better in performance than other similar units.

There have been several hardware and software changes to keep it up to date and the current model is called the PK-232MBX, because it includes a mailbox facility. However, owners of older models can upgrade their units to current specifications, so if you have an earlier version you might like to know what is available and how easily the PK-232 can be upgraded. The prices I have shown are in US Dollars, except where noted.

1. MBX (Pakmail) Daughter Board with new Firmware. Price US$ 85.00 including air parcel post from USA.

The original PK-232 can be upgraded to the latest MBX (mailbox) model by fitting this kit which consists of a daughter board to go inside the case, with new software in ROM. AEA calls the ROM "firmware". The installation is well documented in the instructions supplied and requires you to remove the existing, now obsolete, ROM and RAM chips and fit the new daughter board such that two 28 pin plugs underneath it insert into the vacant ROM sockets on the main PC board. Two new RAM and ROM chips are inserted on the daughter board and one wire is soldered to a resistor on the main board. The whole upgrade only takes about 15 minutes.

The Pakmail or mailbox facility allows the PK-232 to act just like a mini-BBS, with similar commands and features. It is limited to a maximum of 18,000 characters in the messages area, but that should satisfy most users. Rather than use your existing MYcall, eg VK2DYM, you can set a MYMail call for your mailbox, eg VK2DYM-1, and then others can connect to it independently to leave messages for you or for others, receive messages and read messages. You act as the Sysop for your MBX. The firmware supplied with this daughter board kit is the latest version and is described below.

2. MBX Firmware for existing PK-232MBX models. Price US$ 49.95 including air parcel post.

> *"The original PK-232 can be upgraded to the latest MBX . . ."*

Over the period since the PK-232 was introduced there have been several ROM changes, with the latest in August, 1991 when AEA released new Firmware for the MBX. If you have an earlier PK-232MBX that has not been upgraded, this August 1991 release will provide you with all the new and improved features and introduces extra commands for the HF enthusiast. It allows Pakmail on Amtor as well as Packet, "Paklite" — a reduced overhead form of the AX.25 packet protocol which should give a faster data throughput on HF packet operation, and SAMPLE and XBAUD commands for analysis of unknown signals and operation on non-standard RTTY baud rates. Installation of the new firmware is simply a matter of replacing the ROM IC with the new one supplied. On the start up screen you will now see "RELEASE 01.AUG.91" to indicate the latest firmware version.

3. PC-Pakratt II Version 5.1 software upgrade. Price, when ordered with MBX firmware US$ 59.95 incl postage. Price, when ordered with firmware and the MBX daughter board US$ 95.00 incl postage. Price, when ordered alone, approx US$ 15.00 including postage.

The IBM (tm) compatible software upgrade released in August 1991 is supplied as two 13cm disks as well as one 9cm disk. You must return your original disks, the ones with the AEA serial number, to obtain the updates, and it is usual to buy the MBX firmware and if needed, the daughter board, to get the full benefit of this upgrade. There have been a number of enhancements since Version 4.0 of PC-Pakratt II, the most significant of which are a built in text editor, a binary file transfer to packet which is compatible with YAPP, and support for the new firmware commands. There are new, comprehensive manuals and a disk for AEA PC-FAX is part of the package. Incidentally, AEA states that if you bought your PK-232MBX or the PC-Pakratt II program on or after June 22, 1991 you are eligible to receive this upgrade of August 1991 for $US 5.00, providing you send a copy of your receipt and the original disks. No doubt your local retailer provides this service too.

4. PK-232MBX Manual. Price US$ 25.00 plus US$ 20 air parcel postage.

The original PK-232 manual was a bound book with a white cover and red illustration. The disadvantage has been that as amendments were issued they could not be inserted in the book, and page numbers became out of sequence. AEA has now published a loose leaf manual, with all current amendments and provision for inserting any future updates. This 3-ring binder manual has been supplied with new machines since January 1991.

5. Lithium Battery back up. Price — included with the MBX daughter board upgrade.

Earlier PK-232's had three AA batteries in a holder attached to the underside of the lid. Later models have a small lithium battery on the main PC board. The MBX daughter board kit includes this battery too.

All of the above are available direct from AEA in the USA and no doubt can be obtained from local retailers. You should quote the serial number of your machine and the release date of the firmware as shown on the start-up screen when making any enquiries. I don't have any information on software upgrades for MacRATT for Macintosh, or Com-Pakratt for the Commodore 64 computer, but AEA has an Upgrade Hot Line phone number and also

provides technical support through the Compuserve phone BBS. I would expect that the dealer from whom you purchased your unit would provide you with all the details of any developments.

6. 2400 Baud Modem. Price — AEA version US$ 130.00 plus approx US$ 20.00 air parcel post. Price — MFJ version US$ 69.95 plus approx US$ 15.00 air parcel post.

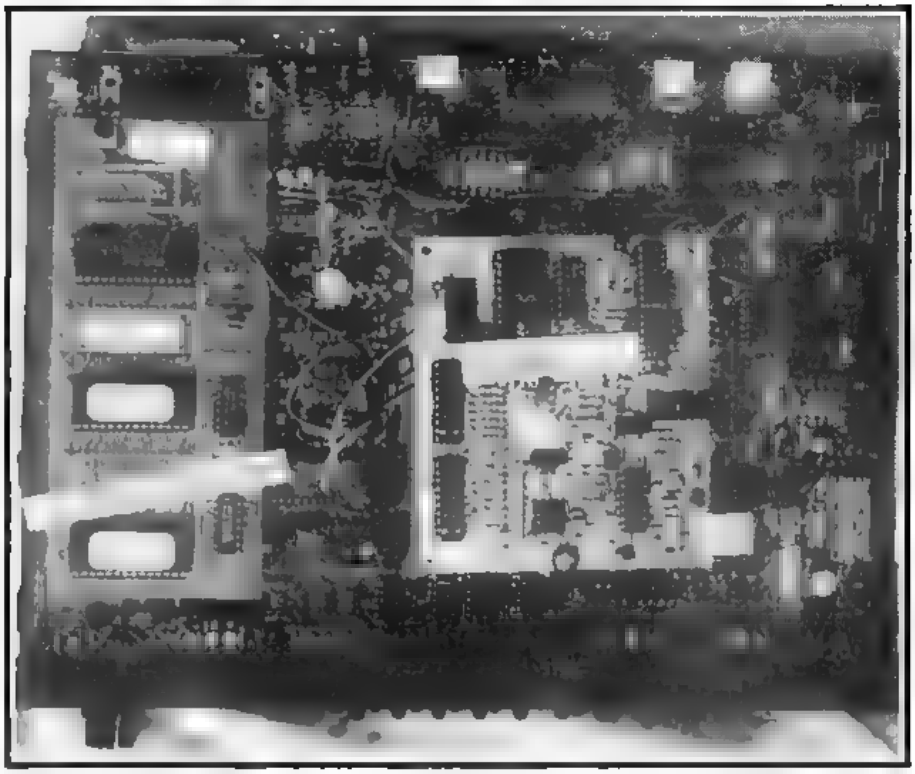
Contrary to what another, ill-informed, writer claimed, AEA does offer a 2400 baud modem for the PK-232. However, they prefer to fit it at their factory so you would have to ship your unit over to them. This is the more expensive option, but at least by keeping your PK-232 with all AEA components you won't have any warranty problems.

A while ago, MFJ in conjunction with Buck Rogers, K4ABT (I swear that really is his name !), developed a user installed version of the MFJ-2400 baud modem, especially for the PK-232 and PK-232MBX. It is designated the MFJ-2400X and differs from the standard model in that it has connecting wires instead of a 20 pin header plug. Installation in the PK-232 is a simple job, requiring soldering 12 colour coded wires to the PK-232 mother board, and bolting the PC board into the PK-232 using an existing pillar and nut.

A comprehensive instruction manual is provided and the whole job takes about 30 minutes. The first K4ABT design required you to fit a small change-over switch to the PK-232 case, but if you have the latest firmware and the MBX board, there is a command — ALTModem 0 or ALTModem 1 — which switches between the 1200 baud and 2400 baud modems via software, a much neater little trick. To change to 2400 Bd you type in ALTM 1 to switch to the faster modem, and HB 2400 to change the transmission speed.

7. 9600 Baud Modem. Price — MFJ version — US$ 109.95 plus postage.

AEA does not support modems above 2400 Bd for the PK-232 but MFJ makes the MFJ-9600 modem which is identical in dimensions to their 2400 Bd unit so therefore it will fit in the PK-232. It is only sold with the standard 20 pin header plug so you would have to remove that and add wires to duplicate the 2400 Bd connections. The PK-232 has a 9600 Bd rate so will function quite OK at this speed, but note that almost all transceivers need modifications to work at 9600 Bd. Note too that you cannot fit both the 2400 Bd and 9600 Bd modems at the same time, at least not without some difficulty. You could conceivably connect the extra modem as an external unit to the PK-232 if you know how to wire it up.



Upgraded PK-232 showing MBX daughter board on left, and added 2400 baud modem in centre. Photo by Colin VK2BVH.

"You could conceivably connect the extra modem as an external unit to the PK-232 . . ."

8. Pre-wired Radio Interface Cables. Price US$ 25.00. (13 pin Kenwood ACC2 costs US$ 30.00).

AEA can supply pre-wired cables to connect your PK-232 to a range of transceivers such as Kenwood, Icom, Yaesu and Alinco. This may not be of much interest to existing PK-232 owners who had to solder up their own connections, but is worthwhile for new purchasers to save time and reduce wiring errors.

As mentioned above, AEA sells direct from the USA and provides fast and helpful service. MFJ only sells via dealers and in this age of electronic funds transfer and Fax machines you may find it of advantage to contact a reputable US retailer, and quote your Visa or Mastercard number. Cheques in US dollars are acceptable of course but your friendly bank will charge you at least A$8.00 just to type out a bank cheque for you. Delivery ex USA is usually within 14 days and you may find it possible to obtain anywhere from 10% to 30% discount on list price from some US outlets. The total cost in Australian dollars is about 1.5 times the US price, which takes into account the exchange rate of about $A 0.75 = US$ 1.00, plus our 20% sales tax. Of course local retailers can also help you with all these products, although I notice that some advertise but do not carry stocks and wait until they have a number of orders before contacting their US supplier.

9. TAPR Modem Disconnect Header. Price US$ 20.00 plus postage.

The Tucson Amateur Packet Radio (TAPR) corporation, a non-profit group, designed some of the very first amateur packet controllers. They included in their TNCs a 20 pin

socket or Modem Disconnect Header which has become an industry standard. However earlier PK-232 units did not have this socket and the latest models have a non-standard 7 pin socket. To allow you to install other brands of modems and various accessories you can build a small PC board from a kit which fits inside the PK-232 and provides this 20 pin Disconnect Header. If you had this kit fitted you could just plug in the standard MFJ-2400 or MFJ-9600 Bd modems, or indeed other products, with no extra wiring needed.

10. State Machine DCD Upgrade. Price US$ 15.00 plus postage.

What the heck is that? Well most TNCs do not have very effective DCD (Data Carrier Detect) so they don't always detect the presence of another signal and transmit over the top of it, or they detect noise as a signal. Either way the result is reject packets and a slowing down of data transfer, particularly in busy regions. At the moment the AX.25 level 2 protocol compounds the problem but proposed changes to become AX.25 level 2, version 2.1 will help. Modems with the 7910 chip are particularly prone to this DCD problem (because the 7910 is basically a telephone modem design) and even those TNC's with alternative demodulator designs which detect a change of state of a valid data signal, hence "state machine", can benefit from an improved DCD.

TAPR supplies an Eprom based DCD kit which mounts inside the PK-232 and derives correct DCD action by lock up of a phase locked loop. It improves DCD operation (TAPR say dramatically) allowing you to run your transceiver unsquelched, for better sensitivity, and with faster TXDelay.

This same kit will fit many other TNCs with a state machine circuit and TAPR has another version for US$ 15.00 to fit those TNC's with the XR2211 demodulator IC.

The most benefit occurs when all stations in the area have decent DCD so that they all detect others' data signals and defer transmissions till the channel is clear, rather than clashing.

TAPR also sells a range of packet related kits and software and accepts cheques in US dollars or Visa and Mastercard only.

11. Dallas Smartsocket. Price approx A$19.00 in Australia.

If you happen to be running a computer control program that does not load a real time clock or loses it when you shut down, you can fit this clock chip-in-a-socket under the existing RAM chip in your PK-232 (and other TNCs). Then you can log the times of all stations heard etc, and don't have to set the PK-232 clock each time you switch it on. The version of Smartsocket for the 62256 ROM used in the PK-232MBX and upgraded PK-232's is the DS1213C from Veltek in Sydney or Melbourne. Other versions of the Dallas Smartsocket may be necessary for different ROM chips.

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WIA News

Amateur Radio in Trans-Continental Balloon Crossing

Amateur radio will be playing a very public role on adventurer/publisher Dick Smith's Australian Geographic Trans-Continental Balloon Attempt, scheduled to fly as this month's magazine is posted (Monday, 31 May).

Dick, VK2DIK, is carrying his HF amateur rig in the gondola slung beneath the balloon, which also houses a host of high-tech satellite navigation and communications equipment.

Another amateur station, comprising Yaesu equipment supplied by Dick Smith Electronics, is set up at Australian Geographic's Terrey Hills, Sydney, headquarters. Using the special event callsign of VI2AUS, it will act as "net control" for contacts between VK2DIK aboard the balloon gondola and amateurs around Australia and world-wide, as well as a backup communications centre. Look for them around 14,140-14,150 kHz, as well as the lower bands. Give them a shout!

In addition, VI2AUS will publicise the event, looking for contacts. A special QSL card is to be issued for all confirmed contacts and SWL reports.

NSW Division Special Projects Officer and "How's DX" columnist, Stephen Pall VK2PS, is coordinating operators for VI2AUS operations.

Type Approval Not Required

Amateur equipment will be exempt from type approval under the new standards and compliance framework of the Radiocommunications Act 1992, according to advice received from Roger Smith, First Assistant Secretary of DOTC's Radiocommunication Division.

Mr Smith conveyed the good news in a letter dated 15 April, which followed up on a meeting between him and David Wardlaw VK3ADW on 24 February and a confirming letter from WIA General Manager and Secretary, Bill Roper VK3ARZ on 16 March.

In his letter, Roger Smith said, "This exclusion has been made because of the experimental nature of the activity pursued by radio amateurs. It is also consistent with the approach taken in other countries, such as Europe.

"We will request that Standards Australia make generic standards covering all radiocommunications equipment. These generic standards will be based on international standards (where they exist).

"Amateur radio equipment would be required to conform to the requirements of mandatory generic standards.

"The WIA has been invited to participate in the relevant Standards Australia committee to ensure that it is able to represent the needs of Amateur users."

Unwanted Coupling of Stray Signal or Noise —

*Lloyd Butler VK5BR * examines some effects and remedies of undesirable noise and instability.*

Most of us who have assembled electronic equipment have experienced unwanted coupling of noise into our circuits or instability because of coupling between circuit stages or modules. An elementary understanding of how this coupling occurs and how it can be reduced can save a few headaches. With this in mind we will discuss relevant topics such as induction into cable and lines, common mode currents and coupling due to common earth or power rail impedance.

Coupling into Cables or Transmission Lines

Signals can be coupled into cables or lines from both stray electric fields and stray magnetic fields. Most vulnerable are low-level audio lines such as those connected to microphones and antenna lines connected to radio receivers. Microphone lines are particularly prone to induction of audio frequency noise from power wiring and other stray fields. They can also pick up higher frequency fields which are generated by nearby radio transmitters. In this case, the RF signal is often rectified in the audio amplifiers to be detected as audio frequency interference, or the amplifiers are overloaded by the signal and saturate. If the microphone is connected to the transmitter generating the RF signal, the system can become unstable. This is often experienced in the amateur radio station as distorted audio or severe oscillation on the modulated signal.

Localised noise fields caused by noisy power lines and noisy electrical appliances are usually greatest in the vicinity of power wiring which conducts the noise signal. For the radio receiver, this source of noise induction can usually be reduced by ensuring that RF signal pick-up is confined to the antenna proper, with minimal pick-up in the feeder cable. Hopefully, the antenna proper will be distanced from the power wiring.

We now turn our attention to the line circuit impedance. Figure 1 shows an interesting circuit coupled via stray capacitance into our cable or line signal circuit. The source impedance and the load impedance of our signal circuit are both equal to a resistance value R. For a given signal power level, the signal voltage at the load is proportional to the square root of the value of R. On the other hand, assuming the reactance of the stray capacitance is large compared to R, the noise voltage across the load R is almost directly proportional to the value of R. Comparing these relationships, we can resolve that, for capacitively coupled noise (the electric component), the ratio of noise voltage to signal voltage is lowest when the circuit impedance is lowest.

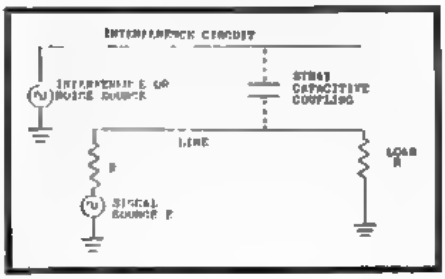

Figure 1 — Coupling via stray capacitance (The electric field)

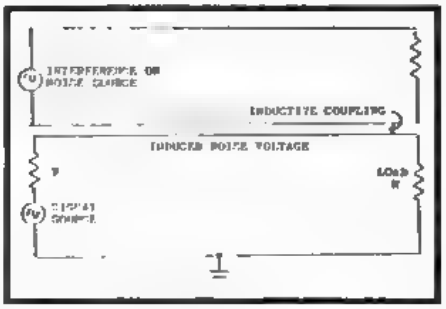

Figure 2 — Coupling via magnetic induction (The magnetic field)

We now discuss coupling of the interference signal via the magnetic field. In Figure 2, one leg of our signal circuit is inductively coupled to our interference or noise source by its proximity to one leg of the noise source so that a noise voltage is induced in series with our signal circuit.

For a given signal power level, the signal current in the load resistance R is proportional to the square root of the reciprocal of R. If we assume a fixed noise voltage induced into the active leg of the signal circuit, the noise current in R is directly proportional to the reciprocal of R. The voltages across R are proportional to the currents through it and, comparing the preceding relationships, we can conclude that for inductively coupled noise (the magnetic field) the ratio of noise voltage to signal voltage is lowest when the circuit impedance is highest. This is opposite of that for the electric field and, hence, in a given line circuit, there can be an optimum value of circuit impedance which gives the best overall signal to noise ratio, considering both types of field.

Shielding

Coupling from an electric noise field can be minimised by electrostatic shielding. For wiring, the active lead or leads are clad with a metallic braided sheath. It is normally necessary to run low-level lines, such as those from microphones, in this shielded wire. Figure 3A shows a shielded microphone line with the shield earthed at its two ends at different points in a building. The problem here is that noise voltage exists between the two earth points. If you want proof that such potentials exist, just connect an AC voltmeter between water taps in different rooms of a building, or between two earth stakes at different locations. Quite sizeable AC voltage can usually be detected, developed from stray earth currents. Referring again to Figure 3A, the potential between the two earth points causes noise current flow in the shield with voltage developed across the series resistance and inductive reactance of the shield. This noise voltage is in series with the microphone circuit and is added to the microphone signal voltage. The golden rule is to only connect one

earth at the amplifier end of the shield, as shown in Figure 3B, so that the noise current cannot flow from the earth system.

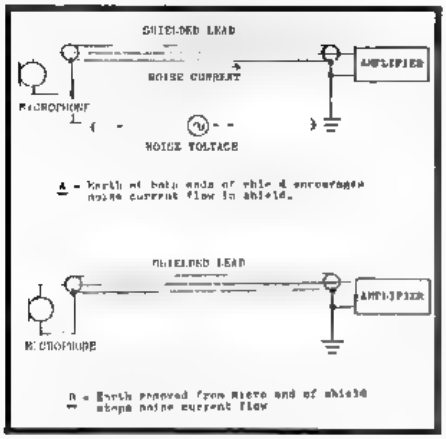

Figure 3 — Earthing of microphone cable shield

Figure 4 — In this arrangement, noise is magnetically coupled into the signal wire from noise current in the shield

Another undesirable connection is shown in Figure 4 where two signal modules are connected by a shielded wire. The modules are both earthed at the one point, but one end of the shield is connected to a different earth location. In this case, the noise voltage developed along the shield is no longer in series with the signal circuit, but is coupled into the signal circuit by magnetic induction. To correct this problem, the right-hand shield connection should either be taken out or, instead, connected to the second module common. At radio frequencies, where coaxial lines connect matched circuits, the second option obviously has to be used.

The same principle of single and earthing applies to antenna feed lines. Where an antenna is mounted on a metal tower and fed with coaxial cable, the outer conductor of the cable is by necessity normally connected to the antenna structure. This, in turn, is fitted to the tower and also electrically connected. If the antenna structure can be electrically insulated from the tower, the outer shield of the coax cable feeder will be more effective as a noise shield. Unfortunately, most of our antenna hardware does not allow us easily to do this.

Balanced Lines

So far we have considered noise induced into unbalanced lines which have one active wire and an earth return line. Where signals must be transmitted some distance, or where coupling between adjacent line circuits must be reduced, balanced wire pairs are used. Circuits connected to the lines are balanced against ground, and the wire pairs are twisted or regularly transposed in some way so that any external electric or magnetic field induces equal currents into the two conductors. Figure 5 shows a balanced line coupled at each end to equipment via a transformer winding which is centre tapped. If the centre taps at both ends are earthed or connected to some other common bus, the induced interference currents (In) flow via the common connection. These are called longitudinal or common mode currents. While the signal current (Is) induces a voltage in the secondary winding of the transformer, the induced interference currents in the two wire legs create equal and opposing magnetic fields in the transformer and induction into the transformer secondary is cancelled.

Figure 5 — Balanced line showing common mode noise current

Of course, balanced circuits are not always well balanced so that the opposing fields do not completely balance, and some interference or noise signal is induced into the secondary. This can be reduced by leaving one or both centre taps floating so that a return path for the common mode circuit is blocked, preventing current flow. This also prevents noise current flow resulting from noise voltage existent between the two earths as discussed in previous paragraphs.

For many low-level circuits, such as microphone lines, the circuit is both balanced and shielded. In this case, the cable shield and the centre tap are both floated at the microphone with earthing only at the end facing the amplifier. The case of the microphone, which shields the microphone insert, is connected to the cable shield.

For the low-level microphone line, a low impedance is chosen to minimise noise induction from electric fields, but not so low that the line is more affected by magnetic fields. A modern broadcast station standard is a 200 ohm microphone source impedance operating into a 600 ohm load. (An earlier standard was 50 ohms operating into around 150 ohms load).

Sometimes we make use of the common mode or longitudinal path in our balanced lines to operate a control or switching circuit. In the days when open wire lines were used for trunkline telephone systems, telegraphs were operated over the common circuits. This type of circuit was called a cailho circuit. Two cailho circuits over two balanced lines were also often used to make a third balanced circuit for voice frequency operation, and this was called a phantom circuit. To go one further, the phantom circuit was centre tapped to form a cailho over which telegraph could be used. The arrangement is shown in Figure 6. Balanced circuits, such as these, which operate at audio power levels of around one milliwatt (0dBm) achieve crosstalk and noise levels satisfactory for speech communication.

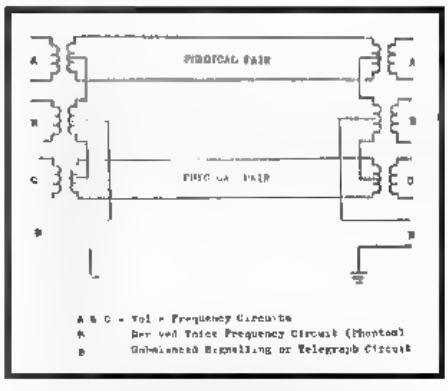

Figure 6 — Making use of common mode circuits to derive further circuits (Cailho and Phantom Circuits)

Of course, leakage to earth can occur on these balanced lines when

there is a faulty insulator on an open wire pair, or when water gets into a cable carrying the line pairs. This causes an imbalance in the line, inviting induction from external noise fields of crosstalk from other adjacent open wire circuits or cable pairs. This is often what has happened when our telephone lines get noisy.

Balanced RF Circuits

Common mode currents in balanced circuits operating at radio frequencies can be effectively blocked by using a balanced choke of adequate inductance (refer Figure 7). The choke, wound on a ferromagnetic core, is bifilar wound to produce high magnetic coupling between the two windings. The common mode currents (In) are in phase through the choke windings and are impeded by the choke's inductive reactance. On the other hand, the signal currents (Is) through the two windings are in antiphase and the magnetic fields produced from these cancel so that they see zero inductance (at least in theory). Hence, the signal is allowed to pass while the common mode current is opposed.

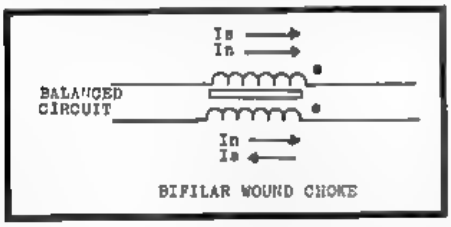

Figure 7 — Use of balanced choke to remove common mode signal component

Power cords and coaxial RF lines are often wound around a piece of ferrite to reduce radio interference into the appliance to which they are connected. In effect, this is a form of balanced choke to impede the common mode or longitudinal RF currents induced in all wires or legs of the cable. In the case of the power cord, we have a trifilar wound choke with common inductance in series with active, neutral and earth leads. The success of the choke is dependent on whether the inductive reactance, at the frequency concerned, is sufficient to attenuate the common mode current to a satisfactory level.

Common mode currents can also be blocked by the insertion of a transformer with separate primary and secondary windings, but coupling still occurs via capacitance across the windings. At audio frequency, the capacitive coupling is virtually eliminated by an electrostatic shield fitted between primary and secondary. At radio frequencies, the elimination of capacitive coupling is difficult if a high coefficient of coupling is to be maintained. Modern RF transformers are multifilar wound on ferrite cores to obtain a high coupling coefficient, making it difficult to incorporate a shield.

RF Filters

Sometimes we fit RF filters in such equipment as a nearby TV receiver to reject interference from our radiated HF signal. High pass filters such as those shown in Figure 8 have a cut-off frequency set to block the HF spectrum while still permitting passage of the VHF-UHF spectrum. Connected in series with the TV receiver antenna line, they are supposed to stop HF pick-up in the antenna or antenna feed line from being fed to the TV receiver. The filter is often ineffective because it has poor immunity to signal pick-up in the common or longitudinal mode. To include common mode rejection, either a balanced choke or a transformer with isolated primary and secondary must be added. To add a matter of interest, the combined filter with common mode rejection also works in reverse to reject TV line timebase noise from being radiated from the TV antenna line and interfering with the HF receiver.

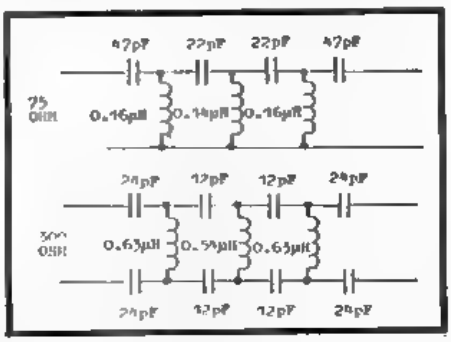

Figure 8 — Typical high pass TV transmission line filters

It must be emphasised that, to provide common mode rejection, the usual type of TV balun transformer (300/75 ohm) does not do the job. This is normally wound as an auto transformer which does not offer common mode rejection.

Coupling Due to Common Impedance

Noise in a circuit module is often picked up from another noisy module because their earth connection (or active power supply connections) are returned to the power supply bus via a common lead as shown in Figure 9A. The common lead has resistance and reactance, the latter of which increases with frequency. The noisy circuit supply current develops a noisy voltage across the other circuit via the common connection. To eliminate this type of problem, the earth lead (or active supply lead) of each module is returned separately to a single point on the supply bus as shown in Figure 9B.

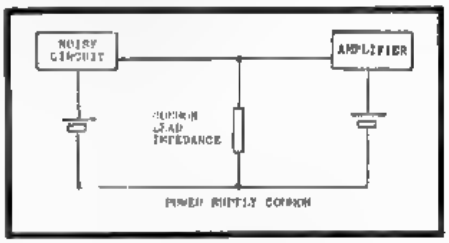

Figure 9A — Coupling via common lead impedance

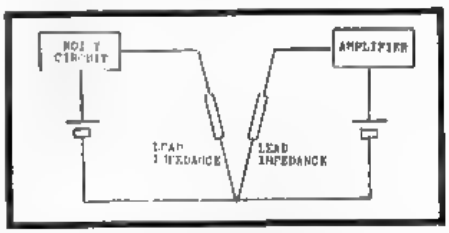

Figure 9B — Separate leads to power supply common to eliminate coupling between modules

Figure 10A shows a number of circuit modules with earths or power feed lines commoned together by looping one to the other. Where there is a chance of signal interaction between these circuits, the interaction from common lead impedance can be minimised by commoning at one point as shown in Figure 10B.

At RF frequencies, the idea of single-point earthing still applies, but as frequency is increased into the VHF-UHF region, the earthing system

can be more defined by the need of short leads in the RF layout.

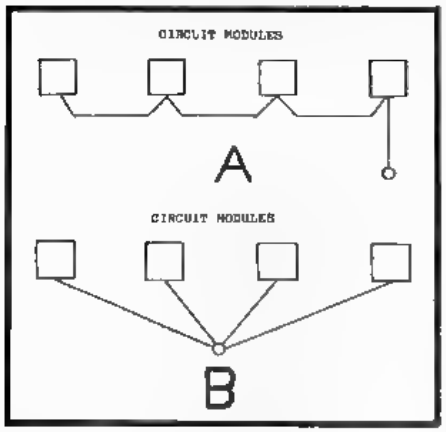

Figure 10 — Commoning of circuit modules — B preferred to A

Stage Earth Returns

Past practice in electron tube or valve amplifiers has been to use a metal chassis as a common earth plane to join earths of individual valve stages. To prevent regeneration or degeneration in an individual stage via a common impedance, good practice for high frequencies was to connect all earth returns for the stage to a common earth point at the valve socket. The common point, and only that point, was bonded to the chassis. The system is shown in Figure 11.

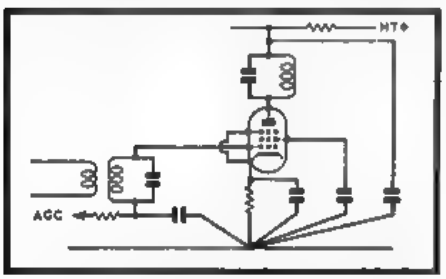

Figure 11 — Single point earth return for valve RF stage (from RSGB Radio Communication Handbook)

The same principle can be applied to solid state circuits. All earth returns for a single transistor stage, or a single integrated circuit package, are returned to the one point which is bonded to a ground plane. In using printed circuit board, the ground plane is provided by the copper sided board. There are various ways of doing this, but one way is to use one copper side of the board as the ground plane while the other is used for the printed wiring links and the component pads.

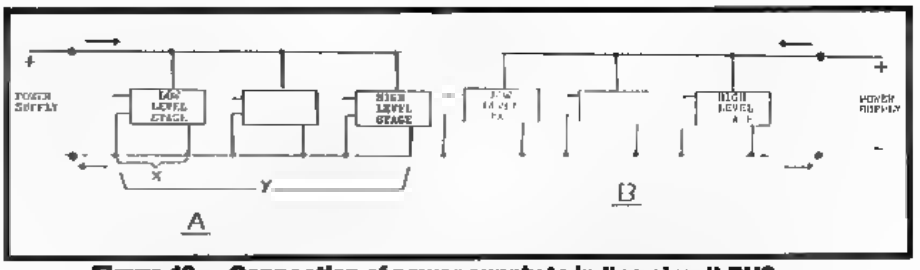

Figure 12 — Connection of power supply to in-line circuit BUS. Preferred connection to high signal level circuit as in B.

Connection of Power to Common Bus

Let us now consider a typical circuit board on which there are a number of amplifier stages starting at a low signal level and ending at a high signal level. The low-level stage takes only a few milliamps from the power rails, whereas the high-level stage runs a supply load current of hundreds of milliamps or greater. The power rails run along the board in consecutive order of the stage levels, with connections made first to the low-level stage and last to the high-level stage.

First we connect the power supply leads to the rails at the low-level stage end as shown in Figure 12A. In this case, the high current to the output stage, complete with a proportional value of ripple from the power supply, must pass through the section of the rail marked X. This can develop noise voltage across the rail impedance at X, and into the low-level stage.

Another effect is that some of the output stage AC signal current can appear on the rail so that output signal component is developed across the rail impedance shown as Y. This can cause instability because of feedback to the input stage. In an audio frequency amplifier this often shows up as low frequency "motor boating" because at very low frequencies, the power rail bypass capacitors become ineffective.

Problems of excessive power supply ripple noise or amplifier instability, as discussed, are often completely solved by re-positioning the power supply connections to the high-level stage section of the power rails as shown in Figure 12B. By doing this, the power rails connected to the low-level stages no longer carry the high current (with its high noise or signal component) to the high-level output stage. Of course, the wise thing is to connect it up the Figure 12B way in the first place.

Induction into Components

Low-level stages usually require shielding to prevent coupling from electric or magnetic fields created by higher level stages or from stray external sources. Some types of inductors have open magnetic fields and can be the cause of stray fields as well as being prone to picking up other fields. Inductors and transformers wound on toroidal cores have confined fields and hence are less prone to interference than those wound on straight ferrite rods. The miniature RF chokes, so useful to make up passive filters, have open fields and must be spaced from each other to prevent interaction. Pot cores have a winding enclosed by ferrite interaction, so that their fields are confined to the ferrite material.

To shield components from electric fields, metal screens are used. Low conductivity material, such as copper, also provides a magnetic shield at high frequencies. Eddy currents induced into the material set up an opposing field which tends to cancel the initiating field outside the confines of the screen. Ferro-magnetic materials can also be used to shield from magnetic fields. An example of this is the screen around a cathode ray tube.

So far we have described stray coupling in terms of induced noise and causing instability. In the case of passive filters, there are a few other effects, if too much coupling occurs between the inductors. This is often experienced when using those miniature RF chokes The coupling can cause change of inductance and loss of Q, resulting in shifting of the cut-off point and degrading its slope. Loss of Q and stray input to output coupling can also degrade the out-of-band attenuation Of course, the

effects of the stray coupling are not always obvious unless the response of the filter is measured and compared to the theoretical model.

Summary

We have discussed various ways in which unwanted signal or noise components can be coupled into our circuits, and we have suggested how this coupling can be reduced. We have dealt with lines and cables in the presence of electric and magnetic interference fields and how the degree of interference from these fields is affected by line or circuit impedance. Shielding has been covered with particular reference to care in earthing. The discussion has led into the use of balanced lines to reduce induction of interference, and the effects of longitudinal currents in these lines. Further discussion has centred around unwanted coupling into circuit modules and components and unwanted coupling between modules and components. The need to avoid certain common supply lines to different modules and the advantage of single-point earthing have also been emphasised.

Getting rid of noise pick-up or stopping interaction between circuits is often treated on a hit-and-miss basis. However, a little thought concerning how the coupling might be occurring can save a lot of trouble. Furthermore, if some of the basic precautions are taken in the first place, the unwanted coupling might be avoided.

This article is fairly basic, but it has been prepared to emphasise several important procedures in connecting up circuits. Hopefully it will provide a little help to the experimenter or home constructor in avoiding those problem bugs.

References

1. Rich, Alan — Understanding Interference-type Noise — Analog Dialogue 16-3 1982
2. RSGB Radio Communications Handbook, Fourth Edition — Section 1, Unbalanced and Balanced Circuits — Section 4, Construction.

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WIA News

Federal Convention

The 1993 WIA Federal Convention, held over the weekend of 2-3 May, saw a total of nine interstate delegates fly into Melbourne. The Convention was opened with a minute's silence in memory of past Federal President, Ron Henderson VK1RH, who died on the preceding Monday.

Held at the Windsor Motor Inn this year, the major highlight of the working sessions was an address from Chris Chenoweth, a solicitor from the law firm of Malleson Stephen Jacques. Chris spoke about proposals for the new structure of the WIA Federal organisation and aspects of the draft revisions of the Memorandum and Articles of Association. He also covered the Councillors' roles and responsibilities as directors of the Federal WIA, which is a company.

A major item of discussion on the weekend's agendas was revisions to the draft Memorandum and Articles of Association. Further work on the M&As will continue between now and the next quarterly meeting in July.

The 17 hours of working sessions were preceded by an informal gathering on the Friday night and broken by the Convention dinner on the Saturday night.

Further details on the Conventions discussions and outcomes will be included in later WIA News items.

Five Examiners Cleared

Further to a previous WIA News item advising the suspension by DOTC of seven examiners accredited to conduct licence examinations under the WIA Exam Service, the Department has indicated that five of the seven have been reinstated, following investigations. The remaining two, from Queensland, are still under suspension.

New WIA Members

The WIA bids a warm welcome to the following new members who were entered into the WIA Membership Register during the month of April 1993.

L20933	MR R R WHITE
L30843	MR G O'CALLAGHAN
L30844	MR R ROWE
L40343	MR W J BOOTH
L40344	MRS C CHILCOTT
L40345	MR L PORTER
L40346	MR G R MCNEIL
L50296	MR L R GILL
L60323	MR M R LYNCH
L60324	MR P R SMITH
L60325	MR M J STRONACH
VK1BOB	MR R M GILCHRIST
VK2GXL	MR A W THOMPSON
VK2GXQ	MR L T GOW
VK2KJU	MR N CUPITT
VK2MMX	MR J VITTORIO
VK2TCB	MR M L WARNER
VK2TIP	MR D A J SHAW
VK2XTB	MR J S TELEK
VK3BOL	MR P C LAYCOCK
VK3TQC	MR A G COTTER
VK3VJR	MR J J ROBB
VK4AR	MR G T RYAN
VK4BTD	MR T A BIRD
VK4DPL	MR P G LANGEVELD
VK4FCW	MR D BALJEVIC
VK4TEX	MR J E SANDS
VK4TMH	MR M H VAN DER LINDEN
VK4VKG	MR D K GRIFFIN
VK4YFF	MR P A GREGORY
VK5TZX	MR P J COCKBURN
VK5ZRA	MR A J ROSS
VK6IA	MR N PRYNNE
VK6KTR	MR T R ROBERTS
VK6NGW	MR G L WOOD
VK6SO	MR P BUSSANICH
VK6YT	MR R J BRADSHAW
VK7KPM	MR P J MCCAFFERTY
VK7NCC	MR J H KLOP
VK7YSH	MR S C HOLMES

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Have you advised DoTC of your new address

EQUIPMENT REVIEW
Kenwood TS-50S All Mode HF Mobile Transceiver

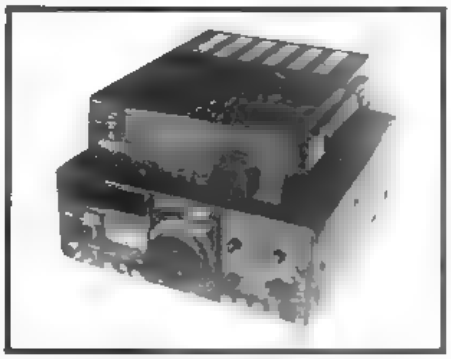
*Ron Fisher VK3OM * looks at Kenwood's latest amateur HF transceiver, "a delight to review".*

Over the last ten to fifteen years, the size of most amateur gear has shrunk in size to a very marked extent. This has been most evident with VHF/UHF equipment which is now about half the size, and delivers twice (or more) the power of the early 1980s models.

However HF mobile transceivers are still the same size and deliver the same power output as those of the early eighties. To be fair, the boxes now contain more features. In that time we have seen the addition of general coverage receivers, automatic antenna tuners, one hundred memories plus numerous bells and whistles. In some transceivers, the weight has been reduced by using plastic in place of steel for cabinet construction but still the size remains much the same.

Well now things have changed. The new Kenwood TS-50S is a fully featured HF 100 watt transceiver that is just under half the volume of the original TS-120S. Taking this one stage further, the TS-50S is actually smaller in size and about the same weight as the original Kenwood synthesized two metre transceiver, the TR-7400A. The TS-50S is a completely new development in amateur HF transceivers. It is not based on an earlier design

This rig may well tempt many amateurs to have a try at HF mobile operation for the first time, and certainly entice many existing mobile operators to sell their old rigs and buy a TS-50S. Have a good look at the comparison photo of the TS-50S, and make up your own mind. I think you will be impressed.



The physical size difference between the TS-50S and a TS120 is quite significant.

The TS-50S Features and Facilities

At first sight, the small overall size is almost unbelievable.The overall dimensions are 179mm wide, 60mm high and 233mm deep. It weighs in at only 2.9 kg. The front panel area of the TS-50S is well under half that of the TS-440S. The receiver section receives SSB, CW, AM and FM with 2.5 kHz selectivity for SSB, 5 kHz for AM and 12 kHz for FM. The same modes are also available on transmit. Receiver coverage is specified as 500 kHz to 30 MHz, but in fact the receiver covers down to 200 kHz with good sensitivity. The transmitter has three power output settings, 100 watts, 50 watts, and ten watts. As with many other facilities, these are selected via a menu set up system. More about this later. The transmitter operates on all amateur bands from 160 to 10 metres. The appropriate side band is selected automatically, but the other sideband can be selected by the push of a button. No antenna tuner is built in to the transceiver, but a miniature automatic ATU is available as an option. This matches the TS-50S in size and shape.

Band selection is via two small up/down buttons above the tuning control which select each amateur band in turn. The "MHz" button changes this to general coverage selection in either one MHz or 500 kHz steps. Each band selected remembers the previous frequency, mode, selectivity and front-end setup such as receiver preamp and attenuator. The tuning control is naturally fairly small, it measures 35 mm in diameter but is very smooth in its action. A small switch under the knob gives two degrees of tension. The first gives a smooth spinning action and the second a firm feel which would be ideal for mobile operation.

Normal tuning rate is in 5 Hz steps which gives 0.5 kHz per knob revolution. As the knob is rotated at a faster rate, the step sizes increases and so it is possible to tune up the band at a rapid rate. Frequency readout is via a large LCD multi-function display which incorporates an "S" / Power output meter and a wide selection of status indicators. As normally set up, frequency readout is to 100 Hz, but it is possible to select a 5 Hz readout via an optional selection from the menu set-up. Once this is selected you can actually get down to a one Hz readout by using the "fuzzy logic" facility. Again more about this later.

Many of the transceiver parameters can be controlled via the microphone. Four small buttons have been added to the front of the microphone which otherwise looks similar to the normal Kenwood MC-42. Each of the four buttons can be assigned any of the forty or so functions in the menu set-up. The usual up/down buttons on the top of the microphone provide for stepping in the VFO mode or memory selection when in memory mode. The VFO steps via the up/down buttons are selectable for 10 or 100 Hz, or 1, 5 and 10 kHz. In addition to this, steps on the standard broadcast band can be switched to either nine or ten kHz spacing for AM reception.

The TS-50S sports 100 memory channels. These can be programmed

The main panel and frequency readout of the TS-50S.

with frequency, mode, filter band width, AGC setting and the receiver front-end settings.

Naturally, there are two VFOs and these can be utilised for split operation. When in this mode, the transmit frequency can be monitored via the "TF-SET" which is a feature of most current Kenwood HF transceivers

The CW operator hasn't been forgotten either. A 500 Hz CW filter is available as an option and the return to receive time is adjustable from 100 ms to 1.8 seconds. Another useful CW function is the "reverse" receive selection which allows reception on the other sideband to help reduce interference.

The TS-50S is also very suitable for data transmission.

No speech processor is included but a carrier insertion adjustment allows optimum setting of the frequency response.This is adjustable from the standard setting by – 100 to + 200 Hz. The front panel of the TS-50S is very simple. There are only five rotary controls, tuning, RIT,IF shift AF gain and squelch. Push buttons control power on/off, AT tune which switches the external automatic ATU, AIP/ATT switches the AIP and front-end attenuator. AIP or Advanced Intercept Point switches out the receiver RF amplifier to give an improved intercept point at the expense of a little front-end gain and the "ATT" switches in a 20 dB front end attenuator. The AIP and the ATT can be selected individually or in tandem.

Noise blanker is simply on or off. No adjustment is provided.The six buttons to the left of the tuning control are for RIT and memory functions. The RIT can be selected to cover either +/– 1.1 kHz or +/– 2.2 kHz. There is no transmit offset.

Above the tuning control are four buttons which control the up/down band selection, the MHz button that switches between general coverage and amateur band selection and finally the frequency lock button. In addition to the frequency lock function this button also allows access to the set-up menu system.

To the right of the tuning control are the three VFO control buttons and in the bottom right hand corner are the mode selection buttons.

Rear panel connectors are very straightforward. An SO-239 coax connector, and a standard six pin DC connector, ALC output, relay output for the control of a linear amplifier and jacks for a key and external speaker. Another six pin plastic connector provides control for the external automatic antenna tuner.

A 6 cm speaker is mounted in the top of the cabinet.

For such a simple layout a lot of features are included, so let's see how it all works out in practice.

The TS-50S on the Air

All the tests were carried out using a 13.8 volt DC power supply capable of delivering 20 amps. In hooking the TS-50S up, I note that Kenwood are now using new type fuse holders in the DC lead which incorporate automotive spade fuses. There is a fuse in each lead. The power switch on the front panel works through some sort of electronic device which requires the button to be held down for about a second. Then on it comes with "HELLO" showing on the display. After another second or so the rig comes to life.

We are ready to start work. The "Hello" message at switch-on.

The slow tuning rate of 0.5 kHz per knob revolution takes a while to get used to, but rotating the knob at about one rev per second speeds up the tuning rate to about 10 kHz per revolution. SSB signals sounded very clean although at high audio output, the speaker developed a rattle. I would think for mobile operation an external speaker would be an advantage. I connected my home station speaker and noted a big improvement in quality, especially on AM reception.

While tuning around on one VFO, I set the other to WWV on 15 MHz. From a cold start, the transceiver was 24 Hz low, and after a couple of hours operation, it finished up 9 Hz high. A total drift of 33 Hz. If this is not good enough for you (you must be fussy!), an optional high stability master oscillator is available

After tuning around for a while, I thought it time to try out the menu set-up. This is accessed by holding down the "F Lock" button for two seconds. The two programs are selected via the VFO A/B/ button. Now there are over forty selections available so there isn't space to describe them all. Kenwood list sixteen in their feature sheet, so I will borrow those. Here we go:

1. Tx power selection 100, 50, and 10 watts.
2. Five selections of LCD display brightness.
3. AGC slow/fast set up.
4. IF filter selection.
5. CW full/semi break-in selection
6. CW pitch 400 to 1000 Hz selectable in 40 Hz steps.
7. CW reverse mode.
8. Encoder lock on/off.
9. Beep tone on/off.
10. Morse mode sound on/off.
11. Repeater CTCSS tone setting including 1750 Hz.
12. Repeater CTCSS; Burst continuous setting.
13. Meter peak hold (Tx, Rx) on/off.
14. AM BC band step 9, 10 kHz selectable.
15. LSB/USB carrier point selectable –100 to +200 Hz on Tx.
16. Automatic power off function (3 hrs fixed intervals) on/off.

Once in the menu mode, the features are selected by the tuning control and the options via the up/down buttons.

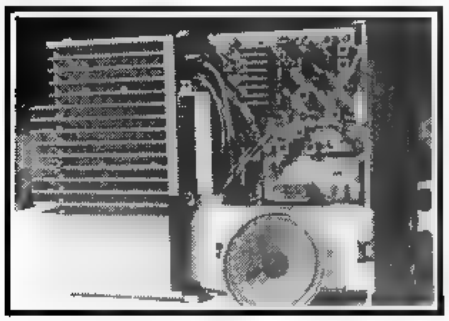
The tuning knob has a very smooth feel. There is a degree of flywheel action in the free position and a firm tension in the second. The tension control is located under the tuning control. The memory system on the TS-50S is very versatile. The 100 channels store frequency, mode, receiver front-end setting, AGC, filter setting and tone frequencies. It is possible to transfer memories from one channel to another, to scroll through the contents of the memory channels without changing the received frequency. Band scan

upper/lower frequencies can be stored in memory 99. But perhaps the best feature of all is that via the menu set-up it is possible to make the memories tunable. In effect this gives you 102 VFOs.

Scanning of the memories can be set for the whole 100 channels or in groups of ten. Scan speed is adjustable via the RIT control. For the CW operator a 500 Hz filter is available as an option. It was not fitted to our review transceiver. CW keying appeared to be very good and no clicks were noted in our test. The receiver incorporates an IF shift which enables the band pass to be shifted in relation to the filter. Its effect was similar to other Kenwood IF shift systems. I found it very useful to reduce interference mainly on the high side of the response, and also reduce the effect of noise.

As seems to be usual these days with simplified transceivers, there is no RF gain control. I get the feeling these days, with good AGC systems, that most operators leave their RF gain flat out anyway. Perhaps I am one of the old school, I like to have one, and I do use it. However, I must say that I didn't really miss the RF gain on the TS-50S. The AGC is better than most and the judicious use of the AIP or attenuator overcame most of my problems. The squelch control works on all modes but would be of greatest use on FM. This was checked out on the 29 MHz band and found to be satisfactory.

The peak hold function on the "S" meter is useful. The last bar on the bar-graph holds for a second or so after the others have dropped away leaving the peak signal reading clearly visible. I know that many amateurs don't like bar-graph meters. Well this one works well, and it is hard to see how an analogue meter could have been fitted to this transceiver anyway.



View with top cover removed.

After a while, the urge to actually put it on the air became too great to resist, so some tests were arranged with Bill VK3ARZ. There is no microphone gain control for SSB as such. In the menu set-up two gain settings are selectable. All tests were carried out with the "High" setting. We optimised the audio response again via the menu set-up and found that +50 Hz from normal sounded best. This is adjustable in 10 Hz steps so you can set the quality "spot on" to suit your voice characteristics.

It sure is easier than opening up the transceiver and adjusting the carrier oscillator trimmers. After all this the audio was rated as excellent with plenty of punch. No speech processor is included in the TS-50S, but nevertheless the audio sounded very full. After several minutes of transmission, the heat sink at the rear of the cabinet became warm only. The internal cooling fan started up and ran for a few minutes keeping the heat sink at a constant temperature. The fan is audible but not too intrusive. Certainly, when mobile you would not hear it at all.

During these tests, Bill checked for intermodulation distortion and the results of this are included in the test section of this review. Unfortunately neither of the automatic antenna tuners were included with the review transceiver. They both look most interesting and I hope I might get an opportunity to look them over in the future.

Finally, I had a look at the "fuzzy logic" used in the tuning system of the TS-50S. This enables you to tune between the normal 5 Hz tuning steps, in effect to give you 1 Hz tuning. By giving the tuning control a quick flick any number between zero and five can be produced. The tuning will still progress in five Hz steps, but instead of starting at zero or five, might start at three. Most interesting to play with but possibly not a great deal of practical use.

The TS-50S on Test

First off, I checked the power output on transmit and the current drain. The three power settings were checked at 14.2 MHz and then the high power output was checked on all bands.

Setting	Power out	Current Drain at 13.8 v
10 watt	9 watts	5.8 amps
50 watt	48 watts	12 amps
100 watt	95 watts	18 amps

Power output CW mode on each band

Band	Power out
160	105 watts
80	100 watts
40	96 watts
30	95 watts
20	95 watts
17	95 watts
15	95 watts
13	92 watts
10	90 watts

PEP output on SSB was about 5% higher than the CW figures.

It is interesting to note that the TS-50S specification makes no mention of the intermodulation distortion. While I don't have access to a spectrum analyser, a few tests were carried out to make an estimate of the distortion using a TS-940S as a standard. The TS-940S is rated at -37 dB for a third order distortion against a single tone output, which equated to -34 dB for a two tone signal. Our tests were carried out using normal speech modulation. We came up with a figure approximately 10 dB worse than the TS940S, which is significant.

Receiver Tests

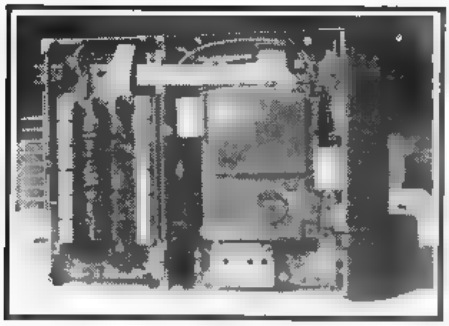
The first test was to check the "S" meter calibration.

S1	1.0 μV
S3	1.3 μV
S5	2.4 μV
S7	5.2 μV
S9	24.0 μV
S9 + 20 dB	240.0 μV
S9 + 40 dB	2.6 mV
S9 + 60 dB	.02 V

These tests were carried at 14.2 MHz. The AGC was checked at the same frequency.

Increasing the signal generator output, I found that there was no increase in audio output once the level reached 1 μV. This is an excellent figure.

An 8 ohm load was connected to the external speaker output, and output and distortion were measured



View with bottom cover removed.

using a 1 kHz beat note Maximum output was 2.5 watts. The specified output of 2 watts with 5% distortion was met exactly. With the audio output reduced to 0.5 watts, the distortion measured 1%. With the audio gain control at zero, the residual noise output was -80 dBm. You won't have trouble with hiss or hum when using headphones on the TS-50S.

The audio frequency response on SSB was then checked. At the low frequency end the -6 dB point was 150 Hz, and at the top end 2700 Hz was — 10 dB. It appears that Kenwood are using a degree of high frequency tailoring in the audio amplifier, as the "S" meter holds up to within — 2 dB at 2700 Hz.

The overall sensitivity of the receiver was measured. This was within +/– 1 dB from 1.8 to 30 MHz. The figures here were taken at 14.2 MHz.

For 10 dB SINAD an input of 0.12 μV was required. With the AIP switched in, this increased to 0.3 μV and with the attenuator in the reading was 2.8 μV. Of course it is possible to select both the attenuator and the AIP together but it's hard to see why this would be needed.

Finally, the selectivity was measured, again at 14.2 MHz and in the SSB mode.

The -6 dB was 2450 Hz and the -60 dB width was 3.9 kHz. Overall these results are very good. The only doubtful point is the intermod distortion which could be better. If the TS-50S is used mobile with a whip antenna, there would probably be no great problem, but if the transceiver was used at home with an efficient antenna, and possibly a linear amplifier, it could cause trouble. Kenwood might like to look into this.

The TS-50S Instruction Manual

The instruction manual runs to 60 pages which are crammed with information. Sections include installation both for mobile and fixed station operation. Controls and connectors are described very well over eight pages. Chapter three shows how to operate the transceiver in the four normal modes, plus data operation. Chapters four and five cover memory and scan functions. Chapter six is appropriately titled, "Other Useful Features". Indeed they are. Subjects covered include the operation of the dual VFOs, the IF shift and noise blanker. However chapter seven is without doubt the most interesting. It's here that the menu setting procedure is covered. This gives an insight into the wonderful facilities built into the TS-50S.

However, my usual grouch with instruction books, there is no technical description. A circuit diagram is included as is an almost complete specification. I score the instruction book an eight out of ten.

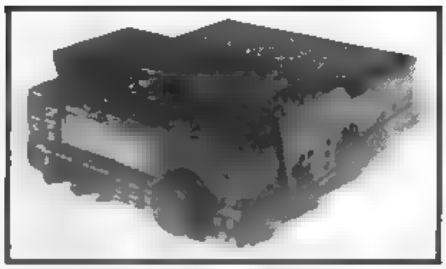
The TS-50S Conclusions

There is no doubt about it, the TS-50S is in a class on its own. It offers all the facilities needed for mobile operation and would make an excellent home station rig where space is limited. In some respects the performance is not quite up with the current larger transceivers, but it's not too far behind either. If you are using an older rig then the performance of this little transceiver will probably amaze you. Every time Kenwood bring out a new line of transceivers, they bring in updates that then carry on to the next models. With the TS-50S, the menu set-up system is one of the greatest advances for a long time.

However, I will conclude this review with a couple of "why don't they's".

Why don't they make the front panel removable? In many cases, even a transceiver as small as this might be hard to fit into a modern car.

Why don't they produce an AC power supply about the same size as the TS-50S? That would be wonderful for portable operation.



TS-50S with Mobile mounting Bracket.

I must admit that it has been a delight to review the TS-50S. I just might be tempted to acquire one before setting off for Northern Australia later this year.

The TS-50S is priced at $1,549-00. The AT-50 automatic ATU is $599, and the PS-32 power supply which can power both the TS-50S and the AT-50 is $466-00.

My thanks to Kenwood Electronics Australia Pty Ltd for the loan of the review transceiver.

* *"Gaalanungah", 24 Sugarloaf Road, Beaconsfield Upper Vic 3808.*

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WIA News

A Hitch In Time

This month will be an extra second longer.

The International earth Rotation Service (IERS) has announced a "leap second" will be added on June 30th. The effect will be to retard Universal Coordinated Time (UTC) by one second.

The Story of Kingsley Radio Pty Ltd, 1938 to 1945 — Part 1

*George W Neilson VK3TES * relates his activities with an old War Horse, the AR7.*

George Neilson VK3TES ex Kingsley Radio

Author's Note:

In this my version of the "Kingsley Radio Story" I have chosen to use "first person" because I convinced myself that the repetition of "I" would be no more boring than "the writer". I have mentioned those associates whom I can remember but I know that there will be many whose names now evade me in my advanced years. To them I offer my apologies for any errors and omissions. My recollections are mainly highlights and cannot do justice to many of my former colleagues.

Radio began for me when I was about eight. My father brought home a crystal radio set, probably from one of the many 1920s second-hand shops. Inquisitive, I had to find out how this amazing device worked. Some time later when no one was around I took the radio out of its box. What I saw did not help me much but I believe that was the moment when my career in Radio was launched.

I completed school in year ten (1933) at Northcote High School. At school I learned the rudiments of radio in a hobbies class. At the beginning of 1934 I was fortunate enough to obtain a job in a hardware shop. What money I could save was spent on buying radio parts to build a receiver. Already I was attracted to Amateur Radio stations, who operated in those days on the broadcast band on Sunday mornings. A fellow Scout, Ron Pollock, had a similar interest and initially we pooled our resources to build a short wave receiver.

At that time Ron had enrolled in a radio course with a Melbourne business college. This college had contracted Kingsley Radio to do the teaching which was carried out at their factory by the staff. During this course he was able to obtain a job with Kingsley.

In 1938 my employer closed, so I was looking for a job. Ron Pollock told me that Kingsley wanted another employee at that time and so I started working for Kingsley Radio Pty Ltd at their factory in Spring Street Melbourne. The Managing Director was Howard Kingsley Love — universally known as HK — well known in the radio trade, and an active Amateur Radio Operator, callsign VK3KU. HK had a secretary named Mollie Malone. The Chief Designer was Jack Gostelow who subsequently went to AWA, the serviceman was Johnny Bremner who eventually went to Rose Morris in South Melbourne and the foreman, Norm Connell, later set up a business making taxi-meters. Others of that era whom I remember were Brian Irwin, Max Downes and his brother Charles. Another employee, who left just before I joined was Harry Fuller VK3HF, who got his Commercial Broadcast licence, worked for 3SR Shepparton and subsequently became Chief Engineer of 3YB Warrnambool.

HK Love and Harry Fuller were notable as radio operator members of the Donald McKay expedition to Central Australia in the 1930s. This expedition was first to use both Radio and Aircraft, and has been referred to in the book "The Last of the Australian Explorers" by Frank Clune.

Kingsley Radio was noted in the industry for its "High Fidelity Radio" employing what was in those days a hot potato, "Direct Coupling". Their Hi-Fi models employed a 2A3 triode output stage direct coupled to the driver stage. These models sold largely on their reputation with satisfied customers. There were also conventional five and six valve dual wave console models and four and five valve battery operated models which sold very well through country agents. They were very economical, vibrator powered from a six volt accumulator. The five valve model power consumption was 0.67 amp. without the dial lights on. There was also a 32 volt model for farm power systems.

I started as "the boy" although I was nineteen, went the messages, got the lunches, made the tea and in my spare time slowly learnt the various skills of the radio trade. I started doing sheet metal work making chassis using a three foot treadle operated guillotine and hand operated bender. These were augmented by a bench mounted hand operated nibbler known as a pattern cutter (a tool used in the boot and shoe industry). Our contribution to "high tech" industry was a bench mounted "Waldown" drill. There were no presses or hole punches. Holes for valve sockets etc were cut with a "Tank Cutter" mounted in a standard hand brace, the cutter being made of a steel slightly harder than lead, often needing several sharpenings to cut one hole! The chassis were assembled with bolts and nuts — no spot welder — and to paint them we had a hand operated spray gun consisting of an old fashioned car tyre pump mounted on the side of a small air tank. After five minutes furious pumping one got about fifteen seconds spray time! Sometimes the foreman, Norm Connell, wanted to do some painting and expected me to keep up with the pumping while he sprayed. All this was done on a landing on the stairs, no fancy spray booth with exhaust fans for us.

From sheet metal I worked up to assembly, wiring and then the real top shelf stuff — testing. My mentor now was Johnnie the serviceman, soon to

become The Chief Engineer as the company started to expand. Johnnie had a story when people asked him "How does radio work?" He would say.

"Can you imagine a very long dog with his head in one town and his tail in another town?"

"Yes."

"And can you imagine that if you squeeze his tail in one town he will bark in the other town?"

"Yes. Gee, is that how radio works?"

"Well, it is if you take away the dog!"

"Uncle Fred was removed from his own private hell and I never saw him again . . ."

We also manufactured Diathermy machines, a simple but fairly high powered short wave generator, used in medical services for applying internal heat to various parts of the body and for coagulation during operations. Johnnie had an uncle who came down to Melbourne from the bush one day. After inspecting most of the pubs in the city and apparently finding them all to be in good working order he wandered into the factory slightly the worse for wear. Johnnie had just finished servicing one of these Diathermy machines and decided that as Uncle Fred was complaining about a crook knee he would be a suitable test piece. So he strapped the rubber pads on the end of the connecting cables on either side of Uncle Fred's crook knee, cranked up the power and went away and left the uncomplaining Fred. Typically, something else took Johnnie's attention and Uncle Fred was forgotten. Eventually the pennies dropped and Johnnie, in some trepidation rushed back to see if Uncle Fred was still with us. There he was, still sitting patiently on the chair, still uncomplaining, very red in the face although on reflection I'm not sure whether because of an overdose of short waves or long drinks! Uncle Fred was removed from his own private hell and I never saw him again, so I cannot report whether his leg fell off or his rheumatics were cured!

The AR7 receiver designed and constructed by Kingsley Radio. This receiver has been restored to mint condition by amateur radio volunteers. It is currently displayed at the Scienceworks Museum, Victoria.

Being a small company we were always involved in new ventures. There was a movie starring Spencer Tracy and John Garfield (I think) called "Captains Courageous". In this movie they made use of a schooner — in the picture I think it was called "We're Here" — but its real name was "Henrietta". It sailed into Williamstown one day and we were contracted to fit marine radio to it. The equipment was designed by Jack Gostelow and made in the factory before being taken to Williamstown for installation. Working on this ship as well as helping to make the equipment was one of the many pleasant diversions which made life interesting.

Our illustrious chief HK had been a Major in the Australian Army in the first World War, then transferred into the Flying Corps where he trained as a fighter pilot, went back to the front, was shot down nine days later and spent the rest of the war in a POW camp from which he made several unsuccessful attempts to escape. He was still on the RAAF Reserve and had a lot of friends in the various services. In hindsight I guess he knew a lot more than the lay public about the fast-approaching Second World War.

We next tried to sell Radio Communication equipment to the Melbourne Harbour Trust for their fleet of ships — hopper barges, dredges and tugs. We set up a base station at "Dockhead" the control centre between North Wharf and Victoria Dock. A "mobile" station was set up on one of the hopper barges — the William Cowper — which carried the spoil from the dredges to be dumped at a special area of the bay.

Again several very pleasant days were spent "swanning" up and down the bay. The boss picked beautiful weather for the trials. Unfortunately we always seemed to be the pioneers who did all the development work and

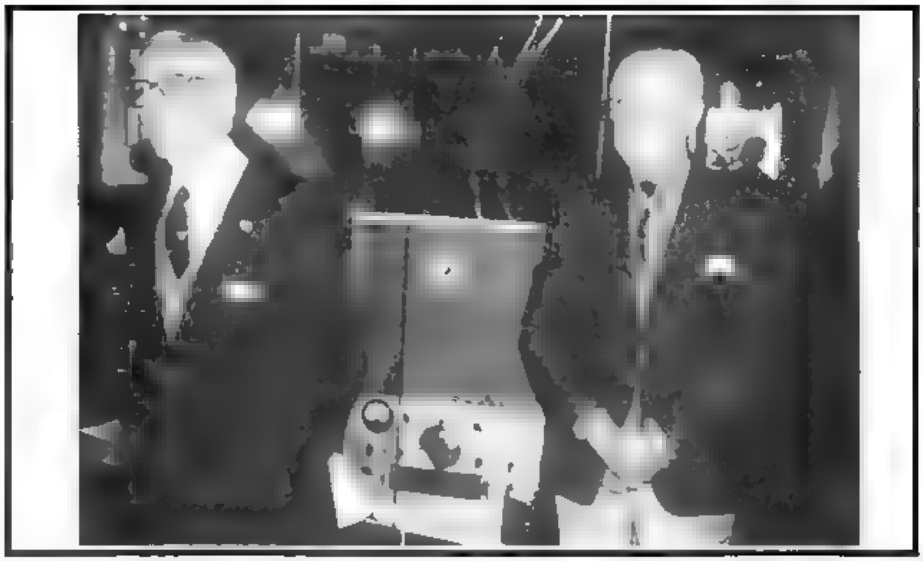
sowed the seeds for somebody else to reap.

The next project was to convince the army that they needed new radio communication equipment. Two prototype portable transceivers were made and installed in HK's and Johnnie's cars and we headed off, HK to Mt Dandenong and Johnnie with his girlfriend and me (a slightly unwelcome chaperone) to the Mornington Peninsula. I still have vivid memories of the six foot length of electrical conduit tied with string to the spare wheel of Johnnie's 1937 Chevrolet to be an aerial, the tyre acting as an insulator. Again the boss picked great weather and occasionally we made contact between the two cars. Again we were doomed only to demonstrate our pioneering spirit.

But all was not lost for while we didn't make the grade with the Army we persuaded the Air Force to buy the portable equipment known as the ATR1 operating on HF. This seemed to be the turn of the tide.

The Air Force issued a Specification for a Communication Receiver, so for the first time we could really let our heads go. Never had I seen so much effort devoted to the design of a receiver to meet this specification with everybody on our small team contributing. I believe that the original concept to base the receiver on the American "National HRO" came from HK with his Amateur Radio background. As a piece of Armed Service equipment it was deemed essential to have maximum ruggedness. The traditional glass dial of conventional receivers was considered not acceptable. A prototype "HRO" type dial mechanism was made by H Alger and Sons who were precision instrument makers allied to the Movie Projection industry

Due to some commercial problem later production of these dials was by Bryant and Hunter also of the Movie Projection industry. The electronic and mechanical design was by Jack Gostelow, Johnnie Bremner and Norman Connell, aided by HK. I had the great pleasure of designing the layout and performing the wiring of the prototype of the "KCR-11" — as it was called — which was submitted for assessment.



Bill Gronow VK3WG (former WIA Federal President) and Allen Doble VK3AMD at the official handing-over ceremony of the restored AR7 to the Scienceworks Museum in November 1992.

The KCR-11 — to be known as the AR7 in the RAAF — was designed as a rack mounting system and consisted of three units, the Receiver, the Power Supply and a Speaker Panel all mounted in a steel rack about a metre high. There were two RF stages, mixer, Crystal Filter, two IF stages, detector, AGC and audio amplifier, BFO and power output stage. The dial drive was a twenty to one worm drive with anti-backlash giving ten turns of tuning. The dial, 12 cm in diameter, had fifty graduations. Each tenth graduation had an elongated hole exposing a second plate behind the dial photo-engraved with a set of fifty one numbers — from 0 to 500. By simple gearing this numbered dial was driven by the tuning dial so that the actual dial position between 0 (minimum capacity) and 500 (maximum capacity) showed through the holes.

The coil boxes were copper sheet, nickel plated, and a set of four coils was mounted on a steel front plate which carried two handles and a stainless steel engraved graph of the frequency tuning for that set of coils. The crystal filter was designed in-house and the crystals were made by the late well-known Max Howden VK3BQ. The crystal holder was assembled in-house also. The power supply was designed to operate from 240 volts AC or 12 volts DC. The coils covered from 150 kHz to 430 kHz in one set, and from 535 kHz to 25 MHz in another four sets.

* 48 Garden Street Blairgowrie Vic 3942

Stolen Equipment

Stolen May 1993 from VK6SI at South Perth, ph: 4774 2115. Kenwood TW1000A dual-band 2m/70cm FM. Serial No 8052033, complete with microphone and antenna diplexer.

Stolen 20th April 1993 from vehicle while in Queen Victoria Building car park, Sydney, ICOM IC27H 2m mobile transceiver, mounting bracket (and half the dash board!). S/N plate missing, inscribed with drivers licence 6613SM (NSW). Rear heatsink broken and epoxied. Enquiries to John Latham VK2KFK (044) 232 855 bus, (044) 216 620 A Hrs.

Stolen from Dick Smith Electronics, Coburg Store, two (2) YAESU 2 metres FM hand held transceivers. S/Ns 2I 172773, 2I 173633. Contact George Alexandrakis, Area Manager, Dick Smith Electronics, 656 Bridge Road, Richmond Vic 3121. Tel (03) 428 1614, or any Dick Smith store.

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Help stamp out stolen equipment — always include the serial number of your equipment in your Hamad

"Simplex" Sideband Transmitter for 3.580MHz

*Drew Diamond VK3XU * has built a cheap 3.580 MHz Transmitter, without fancy parts or tools.*

It is the easy availability of cheap 3.580 MHz crystals that got me thinking- "Wouldn't it be fun to have a go at building a simple single frequency SSB transmitter for that spot?" Being in the mainstream of a popular band, contacts can easily be had on this frequency at night, even with a power level of only a few watts. No fancy parts or tools are required, and all components are available locally. The prototype has the following measured characteristics:

Performance

Frequency:	3.580 MHz, LSB.
Output Power:	4W PEP.
Carrier Suppression:	-42dB.
USB Suppression:	-45dB.
Harmonics:	-50dB.
Output Tolerance:	Will withstand any load SWR, including short or open circuit without damage.

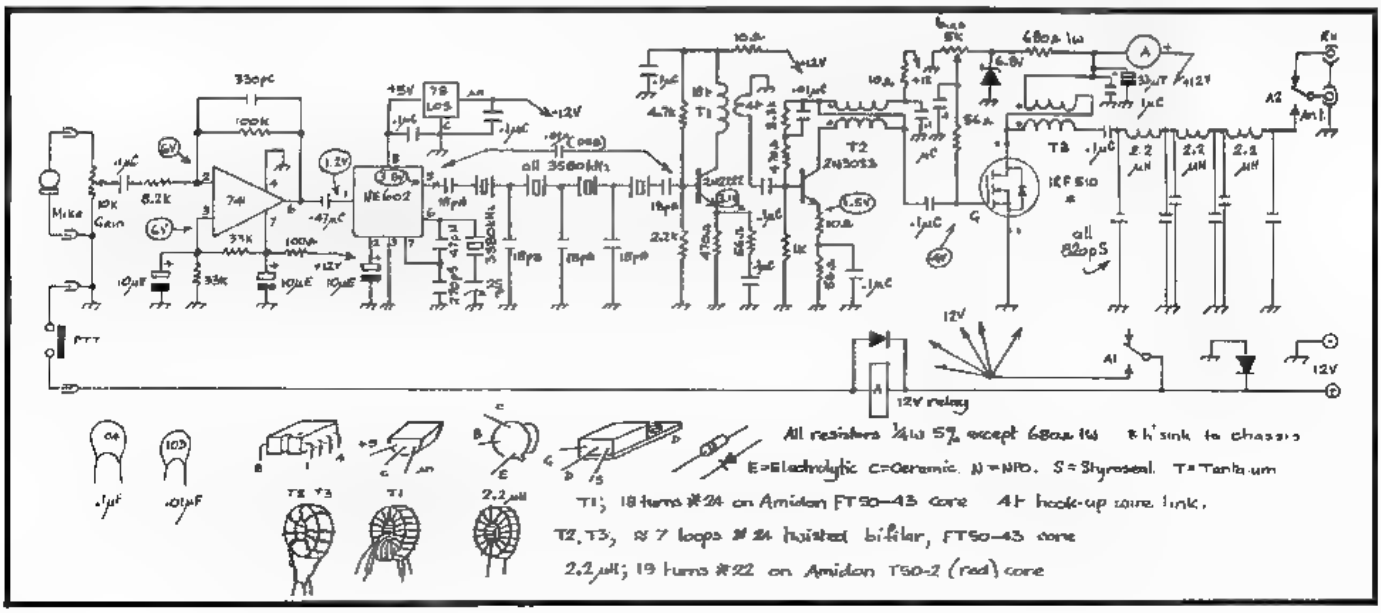
Circuit

Double sideband (DSB) is generated in the NE602 balanced modulator chip, where amplified microphone audio is applied to one of the differential inputs at pin 1. The '602 internal Colpitts connected oscillator transistor maintains the 3.580 MHz crystal in oscillation (pulled high with series C to about 3.5802 MHz) to supply the 'carrier'. No signal appears at the '602 output until audio is applied to pin 1, which upsets the excellent balance at audio rate, thus generating a DSB signal. The simple ladder filter has a band-pass of about 1.8 kHz, which admits the lower sideband only, the upper sideband being greatly attenuated. The resulting microwatt SSB signal is raised in easy increments through a three stage broadband linear amplifier to about the 4W level. The output stage employs a single IRF510 power MOSFET. These make cheap and effective RF power amplifying devices to about 10 MHz, and are virtually indestructible in this configuration.

Construction

A famous home economics book has, on the title-page, the motto; "life's too short to be stuffing mushrooms". Do radio/electronics enthusiasts spend too much time in "stuffing mushrooms"? That is, do we amateurs really need elaborate printed circuit board(s) for every one-off project that we build? I sometimes think that home construction is being hindered, rather than aided, by the blind perceived need for a circuit board. End of soap-box outburst.

The circuitry was built "ugly" style on a rectangle of double-sided circuit board measuring 75 × 175 mm. With a little care and practice, the end-product can be not so ugly — in fact quite presentable. The components are soldered together, joined where necessary as you follow the circuit. The '741 and '602 should be fitted into wire wrap sockets, and the pins gently flared out, except the ground pins, 4 and 3 respectively. These are soldered direct to the foil. Components which have one leg to ground are sufficient in number to provide numerous anchor points for the remaining components. Keep leads reasonably short, particularly RF by-pass capacitors, source of the IRF510, and filter components. In addition, try to keep the whole thing on a low profile, thus making use of the ground plane properties of the board. Where there is a possibility of components shorting to ground (coils and transformers for example), stick a little square of tape onto the board. For best results, use capacitors of the



"Simplex" Sideblander for 3.580 MHz — VK3XU.

types specified. At only slightly greater cost, monolithics make excellent by-pass/coupling capacitors, and offer a saving in space. Disc ceramics may be substituted for polystyrene/styroseals in the output filter at cost of slightly increased loss. A 1500 pF "Greencap" may be substituted for each pair of 820 pF in the output filter. Micas may also be used if available. The 33 μF at the PA must be a tantalum type for low impedance at MF, thus providing effective AF through HF de-coupling.

When the '741 and '602 stages are wired, operation may be checked by temporarily connecting 12 V and listening for the DSB signal on the station receiver.

For effective heatsinking of the IRF510, cut a rectangular hole in the board so that it may sink excess heat into the chassis. The drain is also connected to the mounting tag, so remember to fit insulating hardware at the interface. The source pin may then be soldered directly to the foil.

The 4:1 broadband transformers are made as follows. Take two 200 mm lengths of #24 B&S enamel wire. Twist them together at each end, and fix one end into a vice, the other end into the chuck of a hand drill. Whilst maintaining tension, turn the drill until you have about three twists per cm, then give the drill a tug to "set" the pair. Carefully wind the pair onto an Amidon FT50-43 core, about 7 loops should fit nicely. Cut the wires leaving about two cm each. Scrape the enamel from all four wires, and using a multimeter on ohms, identify each of the two "windings". Now connect the end of one to the start of the other. Winding starts are shown schematically with a dot.

This is "direct-generation" sideband, so the signal frequency from start to finish is the same as appears at the output. To avoid instability problems (the antenna may feed a signal directly back into an earlier stage), the transmitter must be housed in a metal box of appropriate dimensions. The case shown is a Horwood type 34/8/DS measuring 102 *x* 76 *x* 204 mm.

Power supply, nominally 12 or 13.8 V at up to 1 A, may be internal or external to suit requirements or preference. The popular 2155

"Simplex" Sideband

transformer/4-diode bridge/2500 μF capacitor/7812 regulator configuration would be ideal. A second 2500 μF capacitor at the regulator output is also recommended to supply any transient current demand. A 12 Vdc relay with two sets of changeover contacts may be used to effect antenna switching between Tx and Rx from the push-to-talk button on the mike. The relay should be mounted close to the output components and the Rx/Ant connectors to avoid need for wiring with coax. If your relay must be located more than a few cm from any of these, make the connection(s) with miniature 50 ohm coax, grounded both ends.

"A whistle should produce a few watts of power at the load."

If you have a meter of 1 amp dc sensitivity, it would be useful to have it connected in the drain supply line to the IRF510. Indicated current gives a good idea as to what's going on. With a 50 ohm load, speech should flick the current up to about 800 mA on voice peaks, and you can keep an eye on the standing (no-signal) drain current.

A DSB version is possible. Omit the ladder filter and connect the output pin 5 from the '602 via a 0.01 μF capacitor to the base of the 2N2222. For DSB, the crystal trim capacitor may be replaced with a panel mounted variable capacitor, about 100 pF, to give a useful degree of VXO shift. No shift is available for SSB.

Adjustment

Check your hook-up, and confirm that all polarised components are correctly placed. Connect a 50 ohm dummy load/power meter (a 12V/4 W auto lamp will do) to the output. Set the 5 K bias pot for zero volts, and mike gain pot to minimum. Plug in your microphone (an ordinary dynamic radio push-to-talk type, about 200 or 600 ohms). Apply power. In TX mode, adjust the bias pot for a standing current of about 300 mA. No output power should be indicated, and adjustment should give a smooth change in current. Whilst speaking, turn up the mike gain until the drain current flicks up to about 700 or 800 mA. A whistle should produce a few watts of power at the load. Listen to the signal on your receiver (headphones will be required to avoid feedback). Adjust the crystal trim capacitor for natural sounding

sideband, being neither "woolly" nor "tinny". About 5 pF worth, or plates just meshed being a good starting point.

Assuming that the receiver is not overloaded, the signal should be clean and free of splatter, hum, or other unpleasant sounds. If you have an oscilloscope, check the RF output waveform. Peaks should be nicely rounded, with no bright bands anywhere on the envelope, and no appreciable carrier when the mike gain is at minimum.

To aid in any necessary troubleshooting, some key dc voltages are shown on the circuit. If, after reasonable efforts, you cannot make your transmitter work satisfactorily, please write to me at the address above. An SASE would be appreciated.

Parts

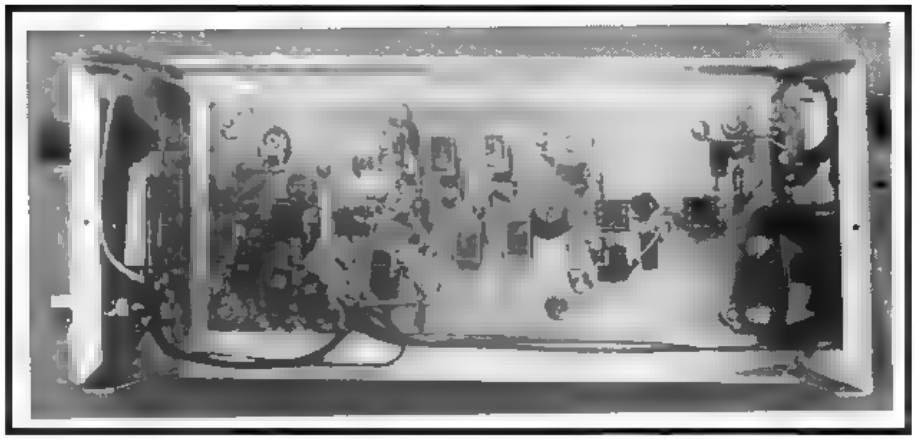
None of the components are difficult to obtain, and most may be purchased from the usual electronics retailers. In addition, NE602's and toroidal cores are available from Stewart Electronics and Truscotts Electronic World. Both firms will answer mail orders. Other Amidon suppliers advertise in this journal. Check local electronics magazines for best prices on crystals.

A Bigger Signal

With a reasonable or good antenna, the 4W signal should provide interstate contacts at night, although the going could be tough over long distances under noisy conditions. As a follow-up project, the output power may be boosted with a suitable linear amplifier. One similar to that described in Reference (5) is suggested, with due consideration to TX/RX antenna changeover connections.

Further Reading

1. "The Ugly Weekender" — R Hayward & W Hayward, QST, Aug "81.
2. Build It Yourself from QST — Hale, KB1MW, QST April-July '92 (serial).
3. How to Lay Out RF Circuits — White, G3SEK, Rad Com Feb/Mar '91.
4. NE602 Primer — Carr, Elektor Electronics, Jan. '92.
5. 25 W MOSFET Linear Amplifier — Diamond, AR Jan '91.



"Ugly" Board Construction.

Parts List for "Simplex"

Capacitors	Qty
18 pF NP0 ceramic	5
25 pF air variable "beehive" trim cap	1
47 pF NP0 ceramic	1
270 pF polystyrene/styroseal	1
330 pF ceramic	1
820 pF polystyrene/styroseal (see text)	6
0.01 μF ceramic (or 0.047 μF)	1
0.1 μF ceramic (or 0.047 μF)	9
0.47 μF non-polar (ceramic or monolithic)	1
10 μF electrolytic 16 V	3
33 μF tantalum 16 V (or 47 μF)	1
Resistors	
10 ohm 1/4 W	3
56 ohm 1/4 W	3
100 ohm 1/4 W	1
470 ohm 1/4 W	2
680 ohm 1 W	1
1 kohm 1/4 W	1
2.2 kohm 1/4 W	1
3.3 kohm 1/4 W	1
4.7 kohm 1/4 W	1
5 kohm flat mount trimpot	1
8.2 kohm 1/4 W	1
10 kohm log pot	1
33 kohm 1/4 W	2
100 kohm 1/4 W	1
Semiconductors	
LM741	1
NE602	1
78L05 5 V regulator chip	1
2N2222, 2N3904 etc.	1
2N3053, BFY50 etc.	1
IRF510, IRF511, MTP4N08 etc.	1
6.2 or 6.8 V 400 mW zener	1
400 V/ 1 A diode	2
Miscellaneous	
— FT50-43 core (2)	
— T50-2 (red) core (3)	
— #22 (0.63 mm) and # 24 (0.51 mm) enamelled wire	
— case to suit	
— circuit board material (double or single-sided)	

(Continued overpage)

— mounting hardware for IRF510
— 8-pin DIL wire wrap sockets (2)
— 3.57945 MHz crystals (5, all identical)
— 12 V relay with two sets of changeover contacts
— coax connector for RX (BNC or RCA)
— coax connector for antenna (UHF)
— connectors or lead for 12 Vdc
— 4 pin mike connector
— pot knob
— screws, nuts, washers, rubber feet
— 1 Adc meter
— power supply or components for same (see text)
— wet weekend (1 or 2)

* "Nar Melan" Gatters Road, Wonga Park Vic 3115

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SSB Phasing Techniques for Receiving

*Richard Hosking VK6BRO * discusses the requirements of an SSB Direct Conversion receiver, and various design compromises are explored.*

Amateur radio nowadays is dominated by complex black box equipment which is practically impossible for the average homebrewer to emulate. However there is still a place for homebrew equipment in the amateur shack. Many designs for direct conversion receivers have been published in recent years to cater for the homebrew enthusiast. These have the advantages of simplicity and reproducability.

However their drawbacks are significant for any serious application. The audio image cannot be removed with conventional filtering meaning that they are prone to adjacent channel interference in todays' crowded bands.

Some designs suffer from rather poor strong signal handling which is a problem not unique to the direct conversion design but rather a function of mixer performance.

The direct conversion design requires very good performance from the audio amplifier which follows the mixer It should have very low noise and high gain. As all or most of the gain in the receiver occurs at audio care must be taken to avoid instability especially due to common paths via power rails. Due to the high amplifier gain microphonics can be a problem.

At the cost of slightly increased complexity many of these problems can be overcome.

SSB Phasing techniques

There are several methods by which one sideband of a double sideboard signal, the audio image, can be removed. The conventional circuit uses a sharp filter, usually a crystal or mechanical device. See fig 1. The filter is relatively expensive and the circuit is limited to one frequency of operation. However this method gives the best currently available performance.

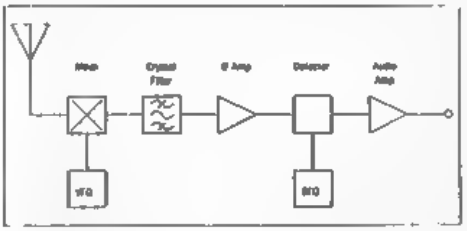

Figure 1 Filter Method SSB Receiver.

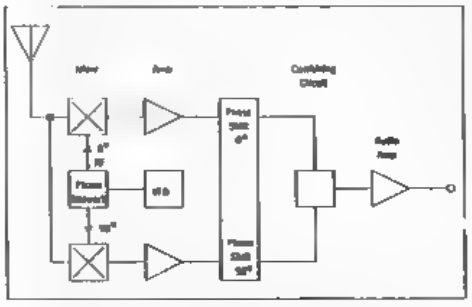

Figure 2 Phasing SSB Receiver.

The phasing method is well known and was widely used in the past. See fig 2. Two mixers are fed with RF local oscillator signals in phase quadrature (90 degrees out of phase). In a receiving system the output from the mixers is passed through audio phase shift networks which give 90 degrees of audio phase shift to one signal relative to the other. When the signals are recombined one sideband is cancelled. The difficult part has always been to obtain accurate 90 degree phase shift over a wide enough bandwidth and this is the reason that these methods have fallen into disuse. However new techniques have become available in recent years which overcome many of the previous problems and make these circuits attractive again.

RF Quadrature Generator

Previously published phasing designs have used passive networks to produce quadrature RF signals. It is possible to obtain a decade bandwidth with these circuits but they use critical components and have never been popular.

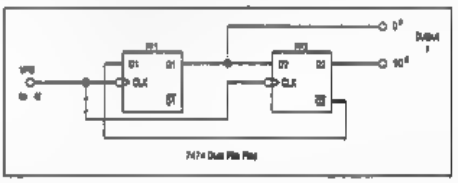

Figure 3 RF Phase Shift Network.

With the advent of digital circuits a new approach is possible. Quite accurate quadrature signals can be generated using two flip-flops in a ring configuration See fig 3. The circuit utilizes a dual edge triggered D flip flop type 74LS74. The VFO input at TTL level is fed to the clock inputs of both flip flops. The Q output of the first device FF1 is fed into the D data input of the second. The NOT Q output of the second device FF2 is fed back to the D input of the first. The flip flops will only change state at each negative transition of the clock input At the next clock transition and not before the Q output will follow the D input. The NOT Q output will always be in the opposite state to the Q output. Thus if we assume the Q pin of the first device is initially logic 0 (low) at the next clock transition the Q2 output will follow. The NOT Q2 output will be logic 1, the opposite state. This in turn will force Q1 high at the next clock transition as NOT Q2

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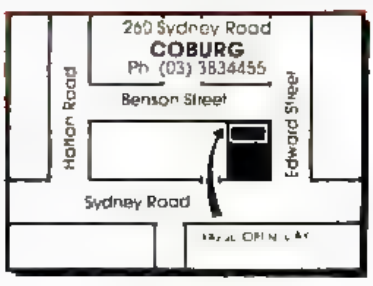
DICK SMITH ELECTRONICS



is connected to D1. FF2 is then forced to change state at the next clock transition and thus the cycle is repeated. Due to the propagation delay of the gates in the flip flop the circuit does not change state instantaneously and the output does not catch up with the input. The result is two outputs at a frequency one quarter of the clock input frequency with one lagging the other by one clock cycle or 90 degrees. This can be seen from the timing diagram. See fig 4.

Figure 4 Timing Diagram 7474.

This circuit is noncritical and will operate at any frequency up to the limit of operation of the flip flops. If fast 74ACT series devices are used in the quadrature circuit the maximum frequency directly obtainable from the circuit is about 40 MHz, for a clock running at 160 MHz. The VFO input must be conditioned to be at TTL level for feeding to the 7474.

It is difficult to quantify the phase error of this circuit but it seems likely that it would depend on differences in propagation delay in the two flip flops.

Audio Phase Shift Network

A 90 degree phase shift can be produced over a decade audio bandwidth using all pass networks fabricated with passive components or op amps. However to realize acceptable phase error they require close tolerance components with non standard values.

The Polyphase network was described in the 1970s as an alternative to these critical networks. It is a new class of network with the unwanted sideband actually being cancelled in the network. See fig 5.

The circuit requires 4 inputs at 90 degrees phase spacing. ie 0,90,180,270 degrees. This produces an output at the other end of the network. If the input phases are reversed, ie 270,180,90,0 degrees, the

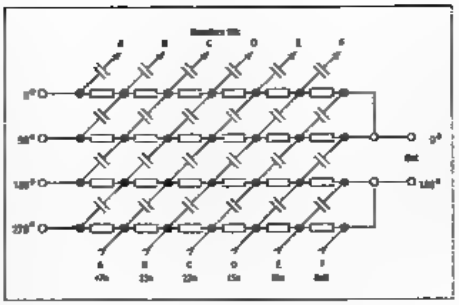


Figure 5 Polyphase Network.

output is zero. This phase reversal happens when the receiver is tuned from one sideband to the other.

The network uses multiple passive components and is very much less sensitive to component tolerances than other circuits. In fact I have used 1% resistors as they are relatively cheap, but 10% tolerance Greencaps. I have performed an analysis of this circuit using a circuit simulation computer program. Varying one component by 10% in each section degraded sideband suppression to approximately 35db. Load impedance does not appear to be critical as far as sideband suppression is concerned though it does affect output voltage. The theoretical maximum sideband suppression is about 80dB at 1 kHz but this drops to about 50 dB at the band edges of 300 Hz and 3 kHz. In practice results will not be as good as this due to component tolerances and phase and amplitude errors in other parts of the circuit.

The Third Method

This method is also known as the Weaver circuit. It will work on both transmit and receive but it is easier to understand the principle of the circuit by studying an SSB generator circuit. See fig 6.

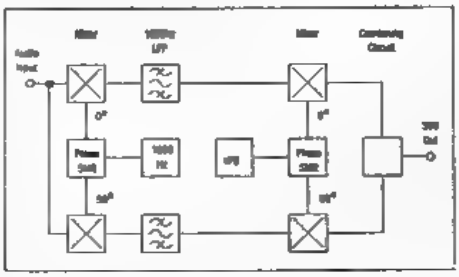


Figure 6 Third Method SSB Generator.

Audio is fed to two mixers which are driven by a subcarrier at 1800 Hz in phase quadrature. The subcarrier has the effect of producing two sets of products; 300 to 3000 Hz + 1800 Hz = 2100 to 4800 Hz and 300 to 3000 Hz — 1800 Hz = 0 to 1500 Hz The second set of products is the audio signal folded around the 1800 Hz subcarrier. See figure 7. The mixers are followed by a low pass filter with a cut-off at 1500 Hz.

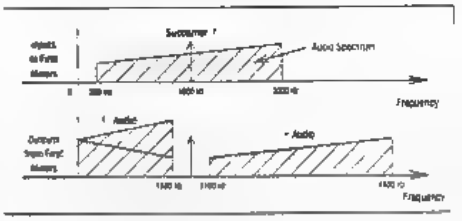


Figure 7 Third Method Audio Spectrum.

This removes one set of products, 2100-4800 Hz, which is in effect one sideband of the final signal. The signals are fed to a second set of mixers with a local oscillator signal in phase quadrature at the signal frequency. When their outputs are combined the resultant signal is single sideband.

To receive using this system the first set of mixers is fed with the local oscillator and the second set with the 1800 Hz subcarrier. When the outputs of the second set of mixers are combined one sideband is cancelled and the original audio is reconstituted.

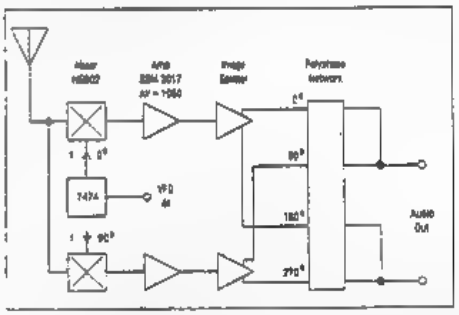


Figure 8 SSB Receiver Front End.

The low pass filters are quite critical as they have to have a sharp cut-off between 1500 Hz and the bottom of the unwanted spectrum at 2100 Hz. A filter of at least 6 poles is probably required

Switched capacitor IC filters are now available which will give this order of performance in a single package and relatively few components. I have not tried this circuit but it would be relatively easy to realize by substituting the low pass

filters and second set of mixers for the Polyphase network described above.

Mixer design

The goals for mixer design are good strong signal handling, conversion gain, and low noise. Less important considerations are local oscillator drive requirements and circuit simplicity.

Unfortunately these requirements are often conflicting. For example to achieve best strong signal handling in an active mixer it should be run at a high collector current which is not ideal for noise performance. On the lower HF bands noise performance and sensitivity are less important than strong signal handling due to band crowding and high ambient noise levels.

Poor strong signal performance can actually worsen mixer noise performance and dynamic range as the multiple intermodulation products produced by strong signals are heard as hash thus raising the mixer noise floor.

I looked at various devices available as mixers. The ring diode mixer offers good strong signal handling but has a conversion loss of about 7 dB. Thus to get reasonable sensitivity the audio amplifier following the mixer must have exceptional noise performance. For example to achieve 1 μV sensitivity with 10 dB S/N the amplifier would need to have a total equivalent input noise of < 0.1 μV. This is achievable with relatively cheap devices now but microphonics can be a problem. The ring diode mixer requires a local oscillator drive power of about + 7 dBm. Even using TTL circuits in the RF quadrature circuit a buffer amplifier was necessary as the TTL gate was unable to drive the mixer directly. Diode mixers can be fabricated from individual components but this increases complexity and packaged devices are relatively expensive.

Many of the recent published designs for DC receivers have used the NE602 active mixer. This device offers conversion gain and a good noise figure due to an inbuilt RF amplifier and active mixer design. However it does suffer from rather poor strong signal handling with a third order intercept figure of -15 dB. In practice it is possible to overcome this by inserting an attenuator on the lower bands and taking advantage of the device gain on the higher HF bands.

The SL6440 high level mixer from Plessey was considered as a third candidate. It has excellent strong signal handling with a quoted third order intercept figure of +30 dBm. However to achieve this figure it has to run at 25 mA current with an output impedance of 50 Ohms and conversion gain of −1dB. With this high collector current noise performance is relatively poor with a noise figure of 11dB.

The comparisons between the various mixers are summarized in Table 1.

Audio amplifier

The signal at the output of the mixer is in the order of microvolts only. Thus to achieve low noise overall the audio amplifier following the mixer has to have good noise performance. Op amps have high gain but are inherently noisy devices due to the virtual earth effect at the inverting input. Thus it is necessary to use purpose designed amplifiers. The SSM2017 from PMI is quoted as having a noise performance of 750 pV/Root Hz or a total equivalent input noise of about 0.04 μV for an audio bandwidth of 300-3000 Hz. The device can be set up with a gain of up to 1000. It gave good performance in a test receiver with no significant noise contributed by the audio amplifier.

Audio System

To take advantage of the sideband suppression of the Polyphase circuit the audio amplifier following it should have a sharp rolloff above 3 kHz as the sideband suppression of the network falls off rapidly above this frequency. I found that a filter of at least 5 poles was necessary. This can be realized using multiple op amps or one of the more recent IC switched capacitor filters.

I have built a test receiver based on the Polyphase circuit. See fig 8. It gave good results on 3.5 MHz with sideband suppression of about 40 dB and acceptable strong signal handling Sensitivity was more than adequate for the 80 m band and an attenuator was necessary to avoid cross modulation. Subjectively the receiver gave excellent performance. I have not tried the circuit on higher bands.

References

Weaver, D.K. A third method of generation and detection of single sideband signals Proc IRE 44:1703-1705 1950

Intermodulation, phase noise and dynamic range Application note in Plessey Professional Products IC Handbook May 1991.

Hey, J.R. Simple SSB Generator employs Polyphase network using standard components. ETI Aug 1979.

New low power single sideband circuits. Signetics Application Note AN1981.

Table 1 Mixer Comparisons

Mixer	3rd Order Intercept	Gain	Noise Figure	Comment
Ring Diode Mixer SBL-1	+10dbm	−7db	—	Expensive, LO Drive +7dbm
NE602	−15dbm	+15db	4.5db	Relatively Poor Strong Signal
SL6440	+30dbm	−1db	11db	High Current, Expensive

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An Approach to Weatherproofing RF Connectors

*Richard Cortis VK2XRC * suggests a solution to a universal problem.*

Introduction

The lack of waterproof performance of RF connections and connectors is a primary cause of poor long-term antenna performance. It is intended to look briefly at the defects arising from water entry with a more detailed appraisal of the various low-cost means available to reduce the rate of water intrusion and corrosion at conductor interfaces.

The Problem

Rainwater is not very conductive, but it has an affinity for various materials readily available in our environment which can make the water an effective electrolyte. This is of primary concern for a number of reasons. Firstly, where an electrolyte forms a bridge between two points in an antenna or feedline which are normally insulated from each other the conductivity of the electrolyte will significantly attenuate the received signal and make reception poor. Where coaxial cable gets water in the outer braid, funny things happen to the nominal impedance of the cable, and signals are degraded. Secondly, the longer term presence of moisture can lead to corrosion of RF conducting surfaces which significantly increases losses and degrades received signals. You lose output, too, and the cables get just a bit hotter. If you are a power freak, or if it is a hot sunny day, the heat and the current speed up the corrosion, and the system degrades rapidly. External connections to antennas are particularly prone to electrolytic corrosion which results mainly from the use of incompatible dissimilar metals (copper and aluminium) in an electrolyte of salt spray and industrial pollutants. Unsealed ends of coaxial cables allow water to enter around the conductors and corrode the metal surfaces. The end result of these problems is the purchase of a new run of coaxial cable together with the makings of a new antenna.

The Hopeful Approach

The usual approach to weatherproofing external connections is to do nothing and hope for the best. Some use soldered-on tabs and steel screws to connect copper wires to aluminium antennas. In a semi-arid environment, this will produce a reasonable result. The order of the connections in relation to the direction of water flow can have a profound effect on the durability of the connection. Other constructors attempt to exclude the water by covering the assembly with a silicone sealant or waterproof mastic material. The trouble with this approach is that few take the detailed steps necessary to ensure adhesion of the sealant to the substrate metal or plastic. No-one ever uses the recommended primer. So what happens? The sealant does not stick to greases used in the manufacture of metal components or tube stock. Silicone materials won't even stick to finger grease or sweat. Nor do they adhere to corrosion products or dirt, etc. Far from excluding the water with its suspended or dissolved pollutants, the sealants with their built-in poor adhesion normally act only to retain the water (complete with conductivity enhancing salts) on the most sensitive parts of the antenna or feedline for a longer period of time, usually whilst the sun is shining to really get the chemical reaction going. We end up with corrosion at the interface between the faces of the conductors on each side of the connection. When the interface dries out, the corrosion products cease to conduct across the connector, and this resistance can affect significantly more than the nominal impedance characteristics of the feedline at that connector. You do not need much imagination to guess what effect this discontinuity may have on the radio frequency performance of the feedline. You may even get some rectification of an unwanted signal.

How Does the Water Get In?

Attempts to exclude moisture from RF connectors such as the ubiquitous PL259 usually follow the old regime of attempting to seal the outside of the connector with a setting type material. Again this serves only to seal the moisture in, and makes disassembly for inspection most difficult. The usual question is "I wonder where all that water got in? It could not have got in at the connector because I sealed it perfectly. You saw how hard it was to get off!" Ho, hum.

The plain fact is that the water gets in through many routes, including the capillary joints that did not adhere and through defects in the sealant that you wiped on with your finger. When the cable gets hot (it is black and sits in the sun) the gases inside the cable heat up and some escape. If there is any moisture, a portion may vaporise and expand enormously, sometimes expelling air and vapour. Then we get a thunderstorm and it rains on a hot cable. The cable cools and so does the gas, and the vapours condense, significantly reducing the pressure inside the cable. Any rainwater falling on the cable and passing a defect will be sucked in. The same happens when your neighbour hoses your gear while you are at work.

"Silicone materials won't even stick to finger, grease or sweat."

Corrosion proceeds on, in, and around exposed external connections and connectors during and after each rainfall event or dew. The hygroscopic nature of some of the salts deposited from the atmosphere or generated as part of the corrosion process can significantly reduce the relative humidity under which the salts will hydrate and form an electrolyte. The usual concoction of dissimilar metals in any connection of a coaxial cable to an aluminium antenna will normally ensure rapid corrosion. There are a few more problems associated with thermal movements and the introduction of sealants to tubular elements and screw threads.

Most leave a lot to be desired, and the sealant acts as a neat plastic

cover to keep the water in till it has all been consumed in the corrosion process.

So What Can We Do About It?

Firstly, there are a number of matters to be considered. We need to consider the degree of exposure to the elements, including rain and sun as well as airborne pollutants, dust and salt spray. One very reliable way of waterproofing connectors is to leave them out. Don't have any. If you have enough cable and you are reasonably confident that your tuning to date can be repeated, feed the cable straight into the Gamma Match. Don't have a connector. Or you can build your half-wave vertical dipole by trimming a quarter wavelength of braid from the end of the cable and wind a few turns around the mast as a trap to stop the RF going back down the outside of the coaxial cable. No connector, no water leaks and no corrosion and a more durable antenna. There was an article on building an antenna like this in AR magazine some time ago. The marine VHF (156MHz) antenna on my boat is designed on this principle; no connectors and no soldered joints! No hassles!

If you must have a connector there are a number of things you can do, each of which works to some degree, but none of which approaches perfection unless you use a military specification connector device. The most important component is your acceptance that we can only approach excellence with our cheap readily available connectors. So where do we go from here? If you have a connector, it means you have a reason to break the cable at that point. So you want to be able to disassemble the connection for maintenance or further experiment. If you don't have a very good reason to have an exposed connector, give very close and detailed consideration to leaving it out. If it's not there, it can't cause a problem. This approach will limit the amount of actual waterproofing to be carried out to necessary connections and connectors.

Let's accept that we get some water in. Then let's go about accommodating that water and try to minimise the damage it can do. Accordingly, we need to look at reducing corrosion on the accessible conductors that carry the RF. We can coat the accessible metalwork with a material which should be non-hardening and non-hygroscopic and should not transmit oxygen so that the corrosion process is halted, or at least significantly suppressed. This will help ensure the mail gets through. Then all we need to do is to protect the threads so we can undo the connection or connector and to cover the lot with something to kid the water into staying away. Sounds simple? All we have to do is to make it work!

The Witches' Cauldron

There are a multitude of materials on the present-day market which make all sorts of claims as to their effectiveness to solve your problem today. Perhaps, but the material used may create a few more problems for you to solve tomorrow. Accordingly, the selection of the most appropriate material is critical to success. However, detailed preparation and correct use are more important. More than one type of material may satisfy the selection criteria in any given circumstance.

". . . is designed on this principle; no connectors, and no soldered joints! No hassles!

I have attempted to set out below a brief selection of materials for use in electrical connections. Materials ideally should be good dielectrics, should not dry out in the sun, should not be soluble in water, and should be of a satisfactory consistency for application. All hard to find in the handyman bar at your local hardware store.

A family of products is marketed under the trade name "Denso". The material is manufactured in Melbourne and there are sales offices in the various capital cities. These include a primer, filler mastic, greasy reinforced tape and a polythene wrapping tape. These materials are smelly as the solvent of the primer evaporates, unattractive in colour and appearance, suggestive of more unpleasant material in colour and consistency, messy to use, difficult to wash off, but extremely effective in service. Make sure you have a supply of hand cleaner material for when you are finished.

There is another group of silicone grease materials distributed by Dow Corning and marketed through Bearing Service outlets in the Sydney area. Of primary use is the Compound 4, Electrical Insulating Compound. This material is a clear paste with little or no odour, and its primary intended function is as a filler or coating in electrical equipment. The published performance data are impressive. It is also useful as a rubber lubricant, and is reported to be non-toxic. It is useful for drawing cables through conduits and for lubricating plastic parts and a multitude of other uses that may take your fancy. It is also a very good release agent, so don't get even a trace on anything you ever want to paint or glue. The published working temperature range is from −57C to

+240C, which should be satisfactory for most amateur radio RF connector applications. Other materials in the family are Compound 7, which is of lower consistency and is intended as a release agent, and Compound 111, which is of thicker consistency and is intended as a rubber lubricant in "O" rings in tap spindles and a multitude of varied application. I use it to lubricate the WC pump on the boat.

What Do You Use Where?

For many years I have used the Denso primer on coaxial cable connector pins and threads, and to prime the exterior of the connector prior to application of the Densyl Mastic. The exterior is moulded over with Densyl Mastic to fill all the depressions before it is wrapped with the Densyl tape, which is similar to the mastic except that it is reinforced with a cotton fabric about 100mm wide. Various widths are available, but the 50mm and 100mm widths are the most useful for our purpose. There are a number of varieties of each. The obscene resultant lump is then over-wrapped with polythene tape or electrical tape to reduce drying in the sun. Don't forget to tie off the end of the electrical tape with one of those plastic electrical ties to stop the tape unwinding in the wind. I live about 100 metres from the sea, and connections dismantled after five years exposure to the sea-spray were in pristine new condition when opened. Don't forget the hand cleaner at this stage, either.

More recently, I have been using the Dow Corning Compound 4 in the pins and threads of connectors, and coating the exterior of the connector with the Denso materials, as I believe the superior dielectric qualities of the Compound 4 may lead to lower electrical losses. It is simpler to just use the Denso material unless you are very concerned about performance.

For exposed connections, everything in sight is coated with the primer using a 25mm wide paintbrush. Try to overcome the urge to scratch behind your ear. Coat all threads and nuts before bolting it up. Where one aluminium tube is telescoped inside another, you must be sure to clean all mating surfaces of mill oil and dirt etc before coating with the Denso primer. Even the screw threads on the hose clamps should be thoroughly coated during assembly. You will be glad you did when you come to dismantle it, because it will unscrew like it is supposed to without having to resort to the hacksaw.

Please note that although the primer material looks like grease, it is not an effective lubricant.

How Do You Do It?

Firstly, put everything together, tune it and make it work. Mark all critical positions and record all critical dimensions. Then you take it all apart again. Sliding joints between sections of aluminium tube are coated inside and out, all threads are coated and you have a great time covering everything with stuff that looks like something your mother told you that you should never touch. What a mess! Coat everything with primer, even the wing nuts, and make sure there is material between all mating surfaces. Get it right the first time because your mother will not let you play with that awful stuff again! Then take the mastic material and fill in the surface and over the wing nuts, bolt heads and the lot to make a good cover and a nice shape that can be taped over. Don't let anything stick out. Then tape it over and tie off the tape with an electrical tie and go and wash your hands again.

If you do this thoroughly you should have well performing antennas and feedlines for quite a number of years.

Materials Summary

Dow Corning Compound 4
— Electrical Insulating Compound
Denso Primer 300 001 (1 litre)
300 004 (4 litre)
Densyl Mastic 400 003 (3kg)
Densyl Tape 610 050 (50mm wide)
610 010 (100mm wide)

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AWA 25M — Some Further Thoughts

*Ian Keenan VK3AYK * updates his original article.*

Following my original article covering the conversion of the AWA 25M lowband car phone back in 1988, I am happy to see many of these units seem to be finding their way onto six metres. In Melbourne there seems to be a growing number of happy users appearing on the local repeater — VK3RMS.

However, it has been found after conversion that a small number of these units seem to be beset with problems. This is usually evident in the transmitter. Typical symptoms are white noise and also what sounds like a bad case of flatulence! These problems are usually the result of lack of drive from the transmitter exciter. This can usually be remedied in the exciter by the following changes:

C54 from 3.3pF to 4.7pF
C45 from 3.3pF to about 6.8pF

Better results would probably be obtained by rewinding the coils that are padded with capacitance in the exciter conversion. But, if the above capacitor changes are carried out there should be a big improvement in performance. Remember to take your time when doing the TX alignment. Good luck!

* *6 Pretoria Street, Caulfield South Vic 3162*

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What are *you* doing to assist the up-and-coming Hams in your area. Your local high school may need assistance or advice to start a radio club.

VHF/UHF An Expanding World

I regret that due to illness of Eric Jamieson VK5LP, VHF/UHF An Expanding World will not appear this month. We all wish Eric a speedy recovery, and look forward to a resumption of his column when he is feeling better. ... Bill Rice VK3ABP Editor.

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Frequencies +/– 5 kHz for QRM.

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AMSAT Australia
GPO Box 2141
Adelaide SA 5001

Arsene report:

Well, I thought we would have had some good news by now. As you probably already know the launch was delayed by accidental damage to an antenna on the main ASTRA satellite. Evidently the damage was repairable and did not require replacement of the antenna. Replacement would have meant a delay of some weeks. Maybe next month I'll be able to give you some post launch details.

MIR report:

The current MIR crew have continued to take part in scheduled QSOs with school based stations. I was involved in one recently and it went very well. They are very patient with questions and answers. The contact with St Columba's college in Essendon, Vic. will be written up in detail by Lee VK3PK who conducted the event. A crew change is due next month and one of the new crew members is involved in space education in Russia. Hopefully this means we can look forward to more of this type of activity.

RS-1, an old timer turns up again:

Recent packet radio bulletins indicate that signals have been heard from the old RS-1 satellite. The bulletins originated from Trace Ward ZL2BS. I'm sure Trace wouldn't mind me mentioning it in this column. He has asked for feed-back. The frequency is 29.401 MHz +/– doppler shift and the CW signal includes sequences like "5015". RS-1 was launched in 1978 and it is quite remarkable that it is still transmitting. Although this kep set is a bit out of date you can use it as a guide.

Satellite Name	: RS-1
Satellite ID	: 11084 (1978 — 100A)
Epoc	: 08MAR93 18:53:35
Inclination	: 82.5490
RAAN	: 185.4602
Eccentricity	: 0.00111
Arg. of Per.	: 143.9081
Mean Anomaly	: 107.0001
Drag	: 0.00000008
Mean Motion	: 11.967252
Orbit Rev. No.	: 62777

Listen a few minutes either side of the predicted times and if you hear anything send a report to Trace Ward ZL2BS @ ZL2AB.#46.NPL.NZL.OC. It may be worthwhile listening for some time on either side of the predictions as 29.4 MHz signals from satellites such as this can propagate over long distances, well over the horizon.

AO-13 report:

AO-13 is still giving good long distance QSO opportunities. Chances are that it will continue to do so as the apogee drifts further south. It is at present 37 degrees north latitude and coming south at about 0.05 degrees per day. The perigee height as expected has increased to about 720 km from a low point last year of less than 600 km. Unfortunately it is predicted that this will be its last increase before dropping down to less than 200 km in about 3 years and burning up in the atmosphere.

AO-13 continues to experience eclipses. They won't be so bad until September having a maximum of 24 minutes but will get worse again in December with eclipses of up to 140 minutes. Watch the transponder schedules as these events will greatly affect the switching sequences

G3RUH program for GEO-STATIONARY satellite look angles:

This program is circulating on the BBSs at present. I can send you a copy on disk if you missed it. As you would expect from James it is accurate, even taking into account the out-of-roundness of the Earth. It is extensively REMed but there are only 35 lines of code so it is easy to type in if that's your only method of entry. The original that I downloaded was missing a colon (:) on line 480 which may cause it to hang up in the execution. After you have LOADed it using GWBASIC, you may have to SAVE it to convert it into GWtalk before you can RUN it. If you pass it on please honour James' request. Pass it on complete and give credit to the author

Note: Some versions of GW may require PI to be defined at the beginning of the program. If this is the case, put it at the start of line 310.

From : G3RUH @ GB7DDX.#22. GBR.EU

The following BASIC program calculates the position of geostationary satellites.

- In compass bearing (Azimuth) and Elevation
- In polar mount angles.
- Uses non-spherical Earth.
- Guranteed free of spherical trigonometry and ozone friendly.
- Fully documented.
- Learn, enjoy!
- Sorry about the GOTO.

Remember to leave a three second break between overs when using a repeater.

```
10  REM "B.GEOSAT" Calculates Geostationary Look and Polar Mount Angles
20  REM
30  REM Version 1.3 Last modified 1986 Aug 20 by JRM
40  REM
50  REM (C)1986 James R Miller G3RUH
60  REM
70  REM Free use encouraged, provided credit given to author
80  REM
90  REM Program calculates Range, azimuth and elevation of a satellite
100 REM on the geostationary belt, as well as the settings for a
110 REM polar mount antenna system.
120 REM
130 REM First find the observer's geocentric coordinates and unit vectors
140 REM UP, North and East, once only. Earth is modelled as an oblate
150 REM spheroid, using the IAU-76 parameters.
160 REM
170 REM Next you are asked for the Satellite's Equator longitude in
180 REM degrees, positive values EAST, negative values WEST. Then its
190 REM geocentric coordinates are found.
200 REM
210 REM Next the observer's vector is subtracted to give range vector,
220 REM and resolved into components UP, East and North, whence AZ and El.
230 REM Polar mount settings are found by resolving Range onto the local
240 REM equatorial plane.
250 REM
260 REM NOTE: Geocentric coordinate system is right handed XYZ, origin at
270 REM the Earth's centre. X and Y axes lie in the Equatorial plane
280 REM with X pointing towards Lat=0, Lon=0, the Y axis pointing to
290 REM Lat=0, Lon=90 East, and the Z axis pointing to the North pole
300 REM
310 RD=180/PI: DR=1/RD: REM PI= 3.141592654 .... Conversion factors
320 :
330 INPUT"ENTER Lat, Long, Height ASL (+N deg, +E deg, metres) ";LAT,LON,HT
340 :
350 LAT = DR*LAT: LON = DR*LON: HT=HT/1000: REM Convert to radians etc
360 CL = COS(LAT): SL = SIN(LAT): CO = COS(LON): SO = SIN(LON)
370 RE = 6378.140: FL = 1/298.257: REM Earth Shape, IAU-76 data
380 RP = RE*(1-FL): RE2 = RE*RE: RP2 = RP*RP
390 D = SQR(RE2*CL*CL+RP2*SL*SL): RX = RE2/D + HT: RZ = RP2/D + HT
400 REM Calculate Observer's unit vectors Up, East, North
410 UX = CL*CO: UY= CL*SO: UZ=SL
420 EX = -SO: EY= CO: EZ=0
430 NX = -SL*CO: NY=-SL*SO: NZ=CL
440 REM Calculate Observer's geocentric coordinates
450 OX = RX*UX: OY = RX*UY: OZ = RZ*UZ
460 :
470 A = 42164  REM Geosat Orbit radius, km. Constants all set up now.
480 :
490 REM + + + + + + + + PROGRAM LOOPS FROM HERE ONWARDS + + + + + + +
500 REM                 ----------------------------------------------
510 INPUT"ENTER Geosat's Longitude, deg (+East, -West) "; SLON
520 :
530 SX=A*COS(SLON*DR): SY=A*SIN(SLON*DR): SZ=0: REM Satellite's vector
540 RX=SX-OX: RY=SY-OY: RZ=SZ-OZ:  REM Range vector = SAT — OBS
550 R = SQR(RX*RX+RY*RY+RZ*RZ):    REM Range magnitude
560 U = RX*UX+RY*UY+RZ*UZ:         REM Resolve Up
570 E = RX*EX+RY*EY+RZ*EZ:         REM East
580 N = RX*NX+RY*NY+RZ*NZ:         REM North
590 :
600 EL = RD*ATN(U/SQR(E*E+N*N)):   REM and compute Elevation, Azimuth
610 AZ = RD*ATN(E/N)
620 IF N    0 THEN AZ=AZ+180:      REM Sort out azimuth quadrant
630 IF AZ    0 THEN AZ=AZ+360
640 :
650 REM Resolve Range vector to local Equatorial plane.
660 X = RX*CO + RY*SO
```

```
670 Y = -RX*SO + RY*CO
680 Z = RZ
690 INCL = RD*ATN( Z/(SQR(X*X+Y*Y)) ):REM Polar mount inclination
700 SLEW = RD*ATN( ABS(Y/X) ):          REM and slew angle
710 D$="E": IF Y < 0 THEN D$="W":   REM Show direction in
720 H$="N": IF Z > 0 THEN H$="S":   REM N S E W terms.
730 D$=D$+" of "+H$
740 :
750 PRINT"Range ";R;" km"
760 PRINT"LOOKING ANGLES : ";"Elevation ";EL,"Azimuth ";AZ
770 PRINT"POLAR MOUNT ANGLES: ";"Inclination ";INCL,"Slew ";SLEW;" ";D$
780 PRINT
790 GOTO 490
```

Example for ASTRA (13 East) from Cambridge, UK (N52.0, E 1.0 deg, 100m ASL:
RUN
ENTER Lat, Long, Height ASL (+N deg, +E deg, metres) ?52.0, 1.0 , 100
ENTER Geosat's Longitude, deg (+East, –West) ? 13
Range 38648.8655 km
LOOKING ANGLES : Elevation 29.4913274 Azimuth 164.895202
POLAR MOUNT ANGLES: Inclination -7.43749539 Slew 13.2232479 E of S
73 de James G3RUH @ GB7DDX.#22.GBR.EU 1993 Apr 12 [Mon] 0836 utc

Next month: Updating kep elements in your tracking program.

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Book Review
The VHF/UHF DX BOOK

Bob Tait VK3UI

This excellent publication (from DIR Publishing) has 12 chapters crammed full of information on how to become a successful DXer, getting the best out of your equipment , measuring performance and equipment to build.

It is written in a very practical way to explain the mysteries of propagation, predicting the best operating periods, planning schedules etc.

Subjects covered are Meteor scatter, moon bounce, ducting, auroral operations, E's and F's, how to recognise the various modes. Plan your operations to become a successful DXer

Ian White deals with the business end on how to get the best out of your equipment describing in detail losses, gains, equipment noise, noise temperatures, antenna noise and how to measure all of these factors. In the next chapter he covers receivers, oscillators, intermodulation problems, front ends and what is best for DX

John Nelson GW4FRX explains how to generate a clean high power signal and coexist with the neighbours. He deals with the subject of amplifiers very well telling you what tubes to use for SSB operation and what tubes not to use. It is all related to the tube's internal capacitance and biasing. John explains commissioning the whole thing without going bang in the night.

He describes how to build a full gallon on 144 using 4CX tubes; there are lots of pictures and diagrams to assist you in construction.

Gunter Hoch DL6WU who is well known for his Yagi designs tells us how to design and construct arrays for all bands from 50 MHz upwards to 432 MHz.

He covers feeder systems, matching, and gives the reader lots of practical ideas and suggestions on how to get practical gain and directivity out of an antenna system

G4DDK describes how to construct and operate transverters and there are PCB layouts, circuits, tune up procedure, interfacing controllers, power supplies.

There is an excellent section which deals solely with power supplies, screen regulation, filament regulators, grid biasing and much more.

Chapter 11 is devoted to alarm and control circuitry for your linear or transverter, it even features an RX/TX sequencer. "What is this?" you may ask. Buy the book and find out about it, build the unit and impress your friends.

At the end of this well laid out book there is a section on test equipment and station accessories. Have you ever wanted a speed controller for your rotator? Well there is a circuit for you to build, as well as a pip tone generator, 2 tone generator, filters, watt meters both RMS and PEP, various VSWR bridges, RF voltmeter. There is even a TDR, and lots more.

I recommend this book to you as most of this information is new and not the same old stuff recycled. It will become a useful addition to any keen VHF/UHF DXer.

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WIA News

New Federal President & Vice President

Kevin Olds, VK1OK, was elected Federal President of the WIA at the Annual Federal Convention, held over the weekend of 1-2 May, in Melbourne.

Kevin has served as Federal Councillor for the ACT Division and on the previous Federal Executive, as well as currently acting in the position of IARU Region III representative. Packet enthusiasts will readily recognise Kevin's callsign.

Neil Penfold, VK6NE, was elected unopposed to the position of Federal Vice President. Neil has served as WA Division Federal Councillor for some 20 years and is QSL Manager for VK9 and VK0. Neil is well-known among the DX fraternity.

Repeater Link

* Will McGhie VK6UU @ VK6BBS

You may remember a long article a couple of months back about an intermittent fault on a UHF repeater, VK6RUF. The fault took considerable time to find as it was intermittent and only occurred between a narrow range from 52 to 54 degrees.

Much to my annoyance the repeater went dead again Investigation found low transmitter output, but this time the fault was mechanical and not temperature related The fault was located in the same area as before, the exciter multiplier stage. Touching a multiplier coil would bring the fault on and off.

The coil was removed for inspection and re-soldered back into circuit, as no obvious fault was found. While the board was out all soldered joints were re-soldered. The exciter stage was given a re-tune and returned to service.

With no fault found there is little satisfaction in this outcome.

Intermittent faults are the worst type of fault. When the fault can not be found or forced to occur there is one thing for sure, it will happen again.

With the repeater back in service time will be the only test. If this fault returns then the next step is to replace the exciter stage completely.

Reliability in your repeater design should be the top priority as it will result in savings of time and money over a long period. If you are tempted to do it on the cheap the end result will cost you more. I will endeavour to keep you informed as to the outcome of VK6RUF, our UHF voice repeater. The repeater has given many years of trouble free service but at the moment it has developed faults that are hard to find.

Waiting

After all the effort to see a change in the regulations relating to repeaters, we are still waiting to benefit from these efforts. All parties agreed on the changes in their draft form over a year ago, and still we are waiting for them to become law.

Repeater regulations as they are prohibit innovative ideas. Unless your repeater or link fitted the regulations, then it was illegal. The refreshing change by the law makers, removed all this regulation and allowed the technology to move.

Unfortunately there has been a long delay in seeing these changes come about

What is causing the delay is only rumoured, and all sorts of deadlines come and go with no clear explanation as to what is the problem.

My reluctance in commenting on this delay is the assumption that it can't be much longer. Even if the new repeater regulations are law by the time you read this, the point is worth making, why have the Amateur population not been kept better informed?

Information like "The minister is to make a statement on the new regs" boiled down to just a rehash of what we already knew, with no time table as to when. Further statements like "Senior Management staff are now looking at the amateur regulations and it is planned to see changes within two months" came and went, with no changes.

All these comments came from high up the tree but to no avail. It appears that amateurs have become involved in government policy and the end result, big delays. Perhaps we should count ourselves lucky that it is not a microwave licence for pay TV we are waiting for.

The rumour that is current is that it is all tied up with the new Radcom Act. Once this becomes law our new regulations will be part of the whole package. Also rumoured is the date for the introduction of the Radcom Act to be July first. The introduction of this new communication bill is no doubt complex and requires time, but why not let the Amateur know what is going on?

It seems as if all amateur input and criticism to the delay has given up.

Jumping up and down becomes tiresome and you go off and do something else that has results.

If the new regulations are what we saw in the draft copy then they will have been worth waiting for and are a credit to all who put them together, but information along the way as to why the delay would have been appreciated

By the time you read this I hope it is now irrelevant and the new regulations are law, particularly the ones relating to repeaters. These thoughts are mine and probably lack understanding of what is going on, but in the light of little information it is the best I can do.

Repeaters — additions, deletions, alterations. Have you advised the WIA of changes needed to the repeater list.

Feedback

Since starting this column over two years ago, I have enjoyed the feedback from readers who are building or have built repeaters. It is interesting to note that most of the feedback is from the more isolated areas of Australia

The capital city repeaters are probably built and maintained by amateurs who have easy access to information, parts, equipment and expertise.

This is what I wanted to start, a focus and a source of simple information on repeaters. To many amateurs putting a repeater on air is simple, particularly if you do it for a living. However for some amateurs setting up a repeater can be a daunting task. It may look easy, but in many cases it is not. A repeater is not just a piece of radio equipment. There are many other aspects that require considerable effort.

Often the most difficult is finding a secure site with power. This problem alone can stop a new repeater before it has even started. Then there is access and security, along with how long is the site likely to remain available. Reliability of the equipment, and have you made a good choice in the type of equipment, are always in doubt. Many of these issues are overwhelming.

What started out as a "let's put a repeater on air" has turned into problem after problem, with delays that at the start would have been laughed at. One repeater in VK6 took 10 years from "let's put a repeater on air" to seeing the service provided.

This is what these words have tried in a small way to help. There is no infrastructure in Australia for repeater builders to find out what they want to know to make the job achievable. It has been said many times "as communicators we don't communicate". It is important for those amateurs new to installing a repeater, or lacking a source of information, to have somewhere to direct a question or two.

Looking through all the queries I have received over the past 2 years, the duplexer and repeater control system are among the most prevalent.

Next month's Repeater Link will be for all those contemplating, for the first time, to put a repeater on air, and having little more than enthusiasm.

* 21 Waterloo Cr Lesmurdie 6076

How's DX!

*Stephen Pall VK2PS **

Some of the "armchair DXers" have the game sewn up. They join nets and lists, leaning heavily — sometimes — on the generous assistance of the net controllers.

Having the report counted to them three times by the DX station, and often just guessing it, they are proud of their achievements, because somebody just said the magic words: good contact.

The same DXers are also good complainers: "The DXpeditions always want donations." One often hears that the propagation is manipulated towards "green stamp" countries. The DXpeditioner is a "mean" fellow for not granting individual favours to move to a specific frequency. "They do not QSL via the Bureau", "They want SASEs for direct QSLing", and so it goes on. The list of complaints is almost endless.

Some of these armchair DXers never think of the expeditioners as ordinary human beings, as hard-working highly stressed and tired operators often deprived of food, sleep or proper accommodation. The armchair DXer seldom regards his counterpart on a tiny speck of sand in the middle of the Pacific Ocean as a volunteer who provides the opportunity for him to work that rare DX country.

A detailed story of the Howland Island (AH1A) and the Kingman Reef/Palmyra (KH5) activity, which appeared in various DX magazines, illustrates the extreme difficulties and sometime life-threatening situations facing the individual amateurs on these undertakings.

Penguin Island — ZS1, Walvis Bay — ZS9

James DJ0WQ, Peter DJ2ZS, Roland DJ4LK and Gunter DK2WH are planning to be active from Penguin Islands (IOTA AF-055) from 25 July to 3 August. They may take two antenna masts with them and also an amplifier. Later, in the second part of August, they will be in Walvis Bay and Namibia. The intention is to work on all bands, 160-10m, both in CW and SSB.

Uganda — 5X

The Ugandan Post and Telecommunications Corporation advised the Geneva ITU authorities on 4 March that the ban on amateur radio activity has been lifted.

Provided there is a valid home licence and valid operator's certificate, the visiting amateur will be issued with a letter of authority to operate during the Ugandan stay.

Residents of Uganda will receive a single-letter suffix, whilst visitors will receive a two-letter suffix starting with X. Bruno 5X1A (QSL to Box 3316, Kampala, Uganda) and Jim 5X1B (QSL to Jim H Brandenburg, American Embassy, Kampala, Dept of State, Washington DC 20521, USA) continued to be very active.

Early in May two more visiting amateurs appeared on the bands: Jim 5X1XX (QSL to K7UP John A Schneider, 9220 Corona Rd, Las Cruces, NM 88001, and Paul 5X1XT (QSL to WF5T Paul Rubinfeld, PO Box 49091, Santa Fe, NM 87502, USA). Quite a number of VKs were able to contact them on 21205 and 14222 kHz.

Libya — 5A and Tunisia — 3V

April has passed, and the proposed activity by Romeo 3W3RR is still in limbo. DX bulletins carried the news that Romeo was sick in Cairo for several weeks. Other sources said he will attend the Dayton Hamfest. There were rumours again that the expedition will take part only if enough funds are donated. Some DX outlets indicated that the activity will be split into two parts, with operators from Spain and Belgium joining the Tunisian section. A Polish DX net even announced that Romeo has cancelled the trip altogether.

The latest news is that Romeo, two Bulgarian operators and one Russian will start the activity from Libya at the end of May. The DXpedition is not fully funded yet, but it appears this time there is a real possibility it will take place — at least from Libya. The group will travel from Egypt by jeep to Damah on the Mediterranean Sea. QSL cards will be posted from Bulgaria. Cross your fingers and hope for the best.

Peter I Island — 3Y

If you missed the Bouget activity some years ago, early 1994 will give you the opportunity to try to work Peter I Island, which is a separate DXCC country in the southeast Pacific Basin in the Bellinghausen Sea, 68.8 South — 90.6 West. Most of the former South Sandwich DXpedition members are preparing already for this activity. An international team of 10 operators, with four HF stations operating in all modes and on all bands, plans to stay on the island for 16 days.

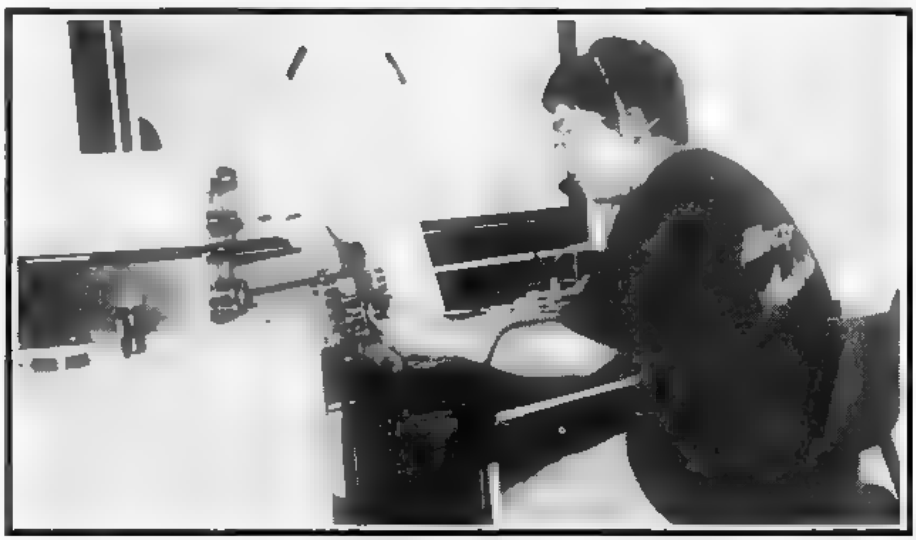
As is already customary with big DXpeditions like this, funds are urgently required to make this project happen. AA6BB and KA6V will accept contributions.

New DX Countries

As expected, the ARRL Awards Committee voted to accept the recommendations of the DX Advisory Committee (DXAC) to add Macedonia (former Yugoslav republic: 4N5, YU5) for contacts made after 8 September 1991 to the list of DX countries. The awards committee also decided to delete Czechoslovakia (OK-OM) effective 1 January 1993, and replace it from that date with the Czech Republic (OK, OL) and the Slovak Republic (OM). QSL cards for these three new countries should be sent to the ARRL DX Desk after 1 June 1993. The total number of current DXCC countries is now 327. There are 56 deleted countries.

Future DX Activity

- There is a new station on air on Tarawa Atoll, Kiribati. The operator is Father Karl, a Catholic priest with the callsign T30NJ. Father Karl's last posting was in Senegal where he was active as 6W6NJ. QSL to Fr Karl J Elsener, PO Box 231, Bikenibeu, Tarawa, Republic of Kiribati.



C21/VK2BEX, Atau working the "Pile up".

- Instead of having a special award this year, the Hervey Bay Amateur Radio Club will activate VK4CHB on a 24-hour basis in the first seven days of August 1993. They will be calling CQ on the 80m DX window, 7100, 14235, 21250, 28495 kHz, and on the Australian novice frequencies. QSL to VK4CHB.
- According to Percy VK4CPA a group of Canadians will be at the magnetic North Pole between 18th and 25th August activating the special callsign CH8MNP
- KB0EBH will operate from the island of St Lucia, Caribbean, in August.
- XT2BW Peter is still very active. After four-and-a-half years of duty, he finishes up in December 1993. He is the only resident amateur in Burkina Faso, so make sure you work him before he leaves. QSL to WB2YQH.
- Look out for Bahrain, A92WH and/or A92C. The operator, Volker DL1WH, will be there until the end of June. QSL to his home call.
- San Felix XQ0X is still very active, the operator is John on SSB.
- HB9AMO/OD5 is in Lebanon for three months.
- There is still no news about the proposed Spratly Island activity. Some well placed DX sources say that the activity is imminent, with only one more signature necessary on the paperwork.
- Canadian amateurs use quite a number of special prefixes in the April-June period, celebrating various anniversaries. The following prefixes were heard: VB1-8, VO3-VO4, VY7-VY8, XJ4.
- EL2YD is Yannick F6FYD until December 1993.
- C9OAB is John G4ZQM, and he is likely to be there for a lengthy time. QSL to John Neary, PO Box 42, Nacala, Mozambique, Africa
- An all YL Dxpedition will visit St Pierre and Miquelon Islands FP — from 17-24 June.

Interesting QSOs and QSL Information

- J52AG-Erik-10110-CW-2145-Apr. QSL to SM0AGD Erik Sjolund, Ormbergsv 17, S-19300, Sigtuna, Sweden
- ET3DX-28495-SSB-0805-April QSL to JH1AJT Yasuo "Zorro" Miyazawa, PO Box 8, Asahi-Ku Yokohama, Japan 241
- XT2BW-14032-CW-0700-March QSL to WB2YQH Robert E Nadolny, 135 Wetherstone Dr, West Seneca, NY. 14224-2540.
- Z21HS-14003-CW-0600-March. QSL to The Manager, PO Box 4110, Harare, Zimbabwe.
- VP2VE-Lee-14226-SSB-1236-Apr. QSL to WA2NHA Howard Messing, 90 Nellis Drive, Wayne, New Jersey 07470, USA.
- 4K0/UA3DJG-Nick-14226-SSB-1128-Apr. QSL to The Manager, Box 98, Ramenskoe 140103, Russia.
- C9LCK/P-Franco-14260-SSB-0520-Apr. QSL to I4LCK Franco Armenghi, via Jussi 9, I-40068, San Lazzaro, Bologna, Italy.
- 4N4CX-14157-SSB-0638-Apr. QSL to WA4WTG R Robert Kaplan, 718 SE, 3rd Lane, Dania, FL 33004, USA.
- C31HK-Fred-14243-SSB-0719-May. QSL to Fred Olte, Cortal Comabella, Sant Julia de Loria, Andorra.
- FT4WD-Christian-21205-SSB-0518-May. QSL to F6AXX Norbert Laurent, 72 Chemin de Bellevue, F 83500, La Seyne Sur Mer, France.
- 6V1A-Ouzin-14265-SSB-0617-May. QSL to The manager, Box 971, Dakar, Senegal, Africa
- A22EX-21205-SSB-0623-May QSL to N4CID Thomas F Wood, PO Box 116, Dunn, NC 28334.

From Here and There and Everywhere

- Atsu VK2BEX had a successful stay on Nauru as C21/VK2BEX. His first QSO was at 0430 UTC on 14 April, and the last one at 1202 UTC on 23 April 1993. Altogether he made about 10500 QSOs, out of which 140 contacts were on 160 metres, 1100 on 80 metres, and there were also 550 RTTY QSOs.

  Atsu made a short visit to Tarawa Island (T30) and had 850 contacts with the special callsign of T30D. Atsu is a relative newcomer to the DXing world. He started his DXing trips in April 1992 as FW/VK2BEX, operated in June 1992 in Fiji as 3D2BX and in October 1992 as operator with the VK9WW DXpedition on Willis Island. He is also part of the proposed Mellish expedition in September 1993.
- Jack T30JH advises me that he has run out of QSL cards. He is expecting a new supply soon and will try to overcome the six-week delay in QSLing. Jack is active on HF bands including WARC, and he is also a keen six-metre operator.
- Jim VK4BX, Secretary of the Hervey Bay Amateur Radio Club, still has a limited supply of the 1991 VI4HBW and the 1992 VI4FOW awards, which are magnificent enlarged photographs of humpback whales at play. Five green stamps will secure such an award. A few QSL cards from the club's Fraser Island November 1991 activity (IOTA OC-142) are still available for the price of the return postage. The club intends to close the logbooks at the end of the year. If you don't want to miss out, contact HBARC, PO Box 829, Hervey Bay, Qld 4655.
- Sid VK2DID reports he worked Demetrio LU3XPM (54 deg 38'S and 68 deg 50'W) just a few miles north of Cape Horn. QSL to Demetrio Luizon, Ave Malvinas A240, 9410 Ushuaia, TF, Argentina.
- Ken VK3TL, the honorary curator of the WIA QSL collection, advises me that he has now arranged a QSL exchange program with the Austrian QSL collection. (See AR Feb 1993). Ken is looking for unwanted QSL card donations from VK and ZL. His address: Ken Matchett, 4 Sunrise Hill Rd, Montrose, Vic 3765
- It is well known that the World Callbook is at least one year "behind" with newly issued callsigns. The delay is caused mostly by the infrequent periodical submission of new callsigns by the telecommunication authorities of various governments. Not so with the Germans, known for their efficiency. The East German callsigns disappeared gradually towards the end of 1992. However, all the former East German amateurs are already listed in the 1993 Callbook under the series DL1 to DL0.
- Ian A92BW, the A9 QSL manager, has retired. Cards to A9 should be now sent to Arab QSL Bureau, Box 22381, Muharraq, Bahrain.
- Some further documentation is needed before P5RS7, the North Korean activity is accepted for DXCC purposes.
- Jakob HB9TL is touring the Pacific during May and June. He plans to be in the Solomon Islands, Vanuatu, Tonga, Western and American Samoa, and as P29TL, 3D2TL, FW/HB9TL on the HF bands, including WARC.
- The Ghana 9G1AA activity produced over 30,000 QSOs. Former Ghanaian amateurs have been told to retrieve their previously confiscated equipment. This augurs well for increased activity from this much sought-after DX country
- Ron ZL1AMO (Ron Wright, 28 Chorley Ave, Massey, Henderson, Auckland 1208, NSW) showed up in Western Samoa as 5W1CW from around 15-21 April and proceeded to Tokelau Islands on 24 April where he was active for four days as ZK3RW. QSL to his home call with SASE
- DJ9ZB reports that during the recent six days operation as ET3D and as 9E2A, he and JH1AJT made 11,000 QSOs with 141 countries. QSLs to respective home calls

- Bernhard DL2GAC (Bernhard Stefan, Aachstr 25, D-7772, Uhldingen-Muehlhofen 1, Germany) has concluded his "tour of duty" in the Pacific area, activating many islands for the IOTA program.
- One does not hear much of Monk Apollo SV2ASP/P these days. He has not been on air for the past 15 months since his disagreement with the DXCC Desk about the alleged "incorrect" operation of DJ6SI from Mt Athos. Some DX sources say that Monk Apollo is a keen listener on the bands, and he was heard from time to time saying "good morning" in Greek to his closest friends without concluding a proper QSO.

"Still no news about the proposed Spratly Island activity."

- I would be glad to receive some information from any of our VK/ZL readers whether they ever received the Pitcairn Bicentennial Award from the "award manager" K6ICS who promised these by the end of 1989?
- Pete N0AFW, who took part in the Kingman Reef and Palmyra Island operation, said the real reason for shortening their activity was not the personal injuries and heavy rain, as reported earlier, but the unexpected delays causing a loss of five operating days due to lack of transportation and lack of power generators. These two factors were beyond their control. The boat "Machias" was late returning from the AH1A activity, and a hurricane which hit one of the Hawaiian islands caused a severe shortage in mobile power generators. N9NS/KH5 was active for four days and 15-1/2 hours (11-15 March) and made about 23,500 contacts N0AFW/KH5 was active for three days and 14 hours (13-16 March) and made around 8800 contacts.

QSLs Received

F6BLQ/D2 (9w mgr F6ELE) HC8A (3w mgr WV7Y) ZP500Y (5w mgr ZP5JCY) 9K2GS (6w op) CO20M (10w op) PZ1EL (5w op) VS6FL (2w op) 9A4AA (3w op) PY0TSN (4m mgr PY3ASN).

Thank You

Thanks to all who keep me informed. In particular, special thanks to VK2BEX, VK2DID, VK2MMR, VK2KFU, VK3DD, VK4BX, VK4CHB, VK4CPA, VK4DA, VK5FV, VK5WO, VK6RO, VK8AV, T30JH, and the following publications: QRZ DX, The DX Bulletin, and the DX News Sheet.

Good DX and 73

* *PO Box 93, DURAL 2158*

ar

Over to You — Member's Opinions

All letters from members will be considered for publication, but must be less than 300 words. The WIA accepts no responsibility for opinions expressed by correspondents.

Feedback

Reference your request for comments on AR.

I think AR is a very good magazine, professionally produced and distributed.

The balance between technical and human-interest content is right, and is not easy to define as it always depends on the contributions received.

I found the printing of the WIA Federal 1992 Annual Reports rather tiresome to read, owing to the small size of the type used. I think such important reports should be printed in larger type.

Why not shout from the rooftops in large print that the financial report showed a profit rather than a deficit, as seems to be the habit of Australian treasurers these days.

I know there are problems in achieving such an aim, eg more pages, cost etc, but maybe other items could be shuffled to the small-print pages instead.

I have been fiddling around with AR computer programs, and maybe the following points — if included in future issues of AR — may be useful:

a: The writer of the program to state which machine/model it was run on and which language/dialogue was used.

b: Printed read-out of program should be used instead of transcription, or if transcribed, checked before used.

c: Probably the best plan is to ask the contributor to provide the discs on request, provided machine, language dialect are stated.

Regards

Quintin Foster
L30720
77 Church St
BEAUMARIS 3193

Border Co-operation — Amateur Radio Exposed

An audience of 70 or so Murwillumbah citizens witnessed a real "Hams in Action" session and an antique radio display at the opening of the Murwillumbah Museum Radio Display.

The museum is funded by the Tweed Shire Council and is administered by the Tweed River Historical Society under the chairmanship of Ron Johanson.

The committee decided, upon persuasion from one of its prominent members, Norm Smith VK2AYU, to allocate space for the donations of old-time radios it had received.

Norm recruited Kev Dickson VK4IW as his right-hand helper. He says he had the misfortune to try to teach Kev the three Rs, and to build crystal sets, back in 1938 at his little one-room school in the backwoods of the Tweed. The crystal sets won!

After much hard work, a respectable display, including lots of wartime equipment, was mounted. The committee was so impressed it decided to have an official opening, and invited the president of the Tweed Shire Council, Max Boyd, and its citizens, on 18 February 1993.

A Kenwood 520 had been donated from the deceased estate of VK2XC Jack, so Norm and Kev got a licence to operate with the callsign VK2DMM. This led us to invite hams to participate in the opening as well, per medium of the magic of amateur radio on a frequency of 7215 kHz.

With loudspeakers rigged so the assembled audience could hear, and a microphone mounted on a tall stand in front of them, Kev VK4IW called in about 10 amateurs one at a time.

The audience heard each amateur respond with their name, their location and that they were standing by for the official speech.

Max Boyd made a magnificent address to the assembled citizens which went over VK2DMM to the listening amateurs as well. He listed the names of all those amateurs, silent key and current, as well as others who had donated to the display.

He also gave thanks to those with technical ability who gave their time to help Norm and Kev get gear operating.

In concluding, a novel way of moving and seconding a vote of thanks to the official speaker was done over amateur radio by Chress VK4AK and Mary VK4MEM, which impressed all those assembled

In a practical way amateur radio was EXPOSED

Kevin Dickson VK4IW
49 Rutledge St
COOLANGATTA 4225

ar

WIA Divisional Bookshops

The following items are available from your Division's Bookshop
(see the WIA Division Directory on page 3 for the address of your Division)

	Ref	List Price
ANTENNAS		
Ant. Compendium Vol 2 Software 5.25" IBM Disk	BX293	$20.00
Antenna Collection — RSGB	BX381	$44.00
Antenna Compendium Vol 1 — ARRL	BX165	$22.00
Antenna Compendium Vol 2 — ARRL	BX292	$24.00
Antenna Impedance Matching — ARRL	BX257	$30.00
Antenna Note Book W1FB — ARRL	BX179	$20.00
Antenna Pattern Worksheets Pkt of 10	BX302	$3.00
Antennas 2nd ed John Kraus — 1988	BX259	$104.00
Easy Up Antennas	MFJ38	$38.25
G-QRP Antenna Handbook	BX452	$22.50
Novice Antenna Notebook — DeMaw W1FB — ARRL	BX182	$16.00
Physical Design of Yagi — 3.5" IBM Disk	BX388B	$20.00
Physical Design of Yagi — 3.5" Mac Disk Excel Format	BX388C	$20.00
Physical Design of Yagi 5.25" IBM Disk	BX388A	$20.00
Physical Design of Yagi Antennas — The Book	BX388	$40.00
Practical Antenna Handbook — Tab	BX026	$49.00
Practical Wire Antennas — RSGB	BX286	$28.00
Reflections — Software 5 inch disk	BX359	$20.00
Reflections Transmission Lines and Antennas — 5.25" IBM	BX348A	$20.00
Reflections Transmission Lines and Antennas — ARRL	BX348	$40.00
Simple Low Cost Wire Antennas	BX219	$25.80
Smith Chart Expanded Scale Pk of 10	BX903	$6.80
Smith Charts S/Scale 1 SET co-ord Imp/Admit Pack of 10	BX901	$4.80
Smith Charts Stand Scale SET Co-ax Pk of 10	BX900	$6.80
The Antenna Handbook — ARRL 1991 edition	BX379	$40.00
The Easy Wire Antenna Handbook	BX002	$20.00
Transmission Line Transformers — ARRL	BX329	$40.00
Vertical Antenna Handbook — Lee — 1990	BX284	$22.00
Yagi Antenna Design — ARRL	BX164	$30.00
ATV		
An Introduction Amateur TV	BX388	$20.00
The ATV Compendium — BATC	BX270	$17.50
The Best of CQ-TV volume 2	BX273	$17.50
CALL BOOKS		
Radio Call Book International 1993	BX339	$49.95
Radio Call Book North America 1993	BX338	$49.95
FICTION		
CQ Ghost Ship — ARRL	BX204	$10.50
Death Valley QTH — ARRL	BX205	$10.50
DX Brings Danger — ARRL	BX206	$10.50
Grand Canyon QSO — ARRL	BX207	$10.50
Murder By QRM — ARRL	BX209	$10.50
SOS At Midnight — ARRL	BX208	$10.50
[redacted]		
ARRL Handbook — 1993	BX399	$52.90
Electronics Data Book — ARRL	BX201	$24.00
Mobile Radio Handbook	MFJ33	$24.95
Motorola RF Device Data — 2 Volumes	BX047	$35.50
Radio Communication Handbook — RSGB	BX286	$56.00
Radio Theory For Amateur Operators — Swainston — 1991	BX367	$42.95
Space Radio Handbook — GM4IHJ — RSGB	BX439	$55.00
World Radio TV Handbook	BX450	$40.00
HISTORY		
200 Meters and Down 1936 — ARRL	BX199	$8.00
50 Years of the ARRL — 1981	BX196	$8.00
Big Ear — Autobiography Of John Kraus W8JK — 1976	BX283	$12.95
Bright Sparks of Radio — RSGB	BX304	$44.00
Dawn of Amateur Radio	BX395	$58.00
Golden Classics of Yesterday — Ingram	MFJ30	$21.95
Spark to Space — ARRL 75th Anniversary	BX310	$25.00
INTERFERENCE		
Interference Handbook — Nelson — 1989	BX161	$25.60
Radio Frequency Interference — ARRL — 1992 Edition	BX186	$30.00
MISCELLANEOUS		
Amidon Ferrite Complete Data Book	BX044	$10.00
Design Note Book W1FB — ARRL	BX267	$30.00
Ferrells Confidential Frequency Listing	BX307	$42.00
Ferromagnetic Core Design & Application Handbook	BX135	$77.00
First Steps in Radio — Doug DeMaw W1FB	BX385	$12.00
G-QRP Circuit Handbook — G Dobbs — RSGB	BX441	$31.00
Ham Radio Communications Circuit Files	MFJ37	$24.95
Help For New Hams DeMaw — ARRL	BX308	$20.00
Hints and Kinks 13th edition — 1992 — ARRL	BX330	$18.00
N[redacted] ARRL	BX384	$24.00
Novice Notes, The Book — QST — ARRL	BX298	$12.00
QRP Classics — ARRL QST	BX323	$24.00
QRP Note Book — DeMaw — ARRL	BX170	$20.00
Radio Astronomy 2nd edition — John D Kraus — 1986	BX282	$78.00
Radio Auroras — RSGB	BX381	$30.00
Radio Buyers Source Book — ARRL	BX377	$30.00
Shortwave Receivers Past and Present	BX253	$22.00
Solid State Design — DeMaw — ARRL	BX171	$24.00
Vibroplex Collectors Guide	BX025	$36.00
MORSE CODE		
Advanced Morse Tutor — 3.5" Disk	BX328A	$40.00
Advanced Morse Tutor — 5.25" Disk	BX328	$40.00
Morse Code — The Essential Language	BX223	$10.00
Morse Code for Radio Amateurs — RSGB	BX451	$18.00
Morse Code Tapes Set 1: 5-10 WPM — ARRL	BX331	$18.50
Morse Code Tapes Set 2: 10-15 WPM — ARRL	BX332	$18.50
Morse Code Tapes Set 3: 15-22 WPM — ARRL	BX333	$18.50
Morse Code Tapes Set 4: 13-14 WPM — ARRL	BX334	$18.50
Morse Tutor 3.5" IBM Disk	BX187A	$20.00
Morse Tutor 5.25" IBM Disk	BX187	$20.00
OPERATING		
Amateur Radio Awards Book — RSGB	BX297	$30.00
Amateur Techniques — G3NA — RSGB	BX393	$36.00
DXCC Companion — How to Work Your First 100	BX345	$12.00
DXCC Country Listing — ARRL	BX386	$5.00
FCC Rule Book — A Guide to the FCC Regulations	BX379	$18.00
Locator Map of Europe — RSGB	BX396	$8.00
Log Book — ARRL — 9" x 11" Wire Bound	BX202	$7.00
Low Band DXing — John Devoldere	BX195	$20.00
Operating Manual — ARRL — 4th Edition	BX192	$36.00
Operating Manual — RSGB	BX359	$31.00
Passport to World Band Radio	BX348	$34.00
Prefix Map of North America	BX235	$8.00
Prefix Map of the World — RSGB (laminated)	BX397	$20.00
RTTY Today — a Guide to Amateur Radioteletype	BX003	$18.00
Short Wave Propagation Handbook	BX286	$16.00
The Complete DXer — W9KNI	BX194	$20.00
Transmitter Hunting	BX222	$43.00
World Grid Locator Atlas — (Maidenhead Locator) — ARRL	BX197	$10.00
PACKET RADIO		
AX.25 Link Layer Protocol — ARRL	BX178	$16.00
Gateway to Packet Radio 2nd edition — ARRL	BX188	$24.00
Packet Computer Networking Conference 1-4 1982/5	BX186	$36.00
Packet Computer Networking Conference No 10 1991 — ARRL	BX378	$25.00
Packet Computer Networking Conference No 5 1986 — ARRL	BX187	$20.00
Packet Computer Networking Conference No 6 1987 — ARRL	BX188	$20.00
Packet Computer Networking Conference No 7 1988 — ARRL	BX154	$25.00
Packet Computer Networking Conference No 8 1989 — ARRL	BX295	$20.00
Packet Radio Made Easy — Rogers	MFJ32	$20.50
Packet Radio Primer — G8UYZ — RSGB	BX440	$32.00
Packet Users Notebook — Rogers	BX285	$18.50
SATELLITES		
Oscar Satellite Review — Ingram — 1988	MFJ31	$17.00
Satellite AMSAT 5th Space Symposium — ARRL	BX152	$17.50
Satellite AMSAT 6th Space Symposium — ARRL	BX199	$17.50
Satellite AMSAT 9th Space Symposium — ARRL	BX453	$24.00
Satellite Anthology — 1992 Edition — ARRL	BX180	$20.00
Satellite Experimenters Handbook	BX177	$40.00
Space Almanac — ARRL	BX299	$50.00
Weather Satellite Handbook — ARRL	BX324	$40.00
Weather Satellite Handbook Software 5.25" IBM Disk	BX326	$20.00
VHF/UHF/MICROWAVE		
All About VHF Amateur Radio — Orr	BX216	$17.30
International VHF FM Guide — G3UNK — RSGB	BX399	$14.00
Microwave Handbook Vol 1 — RSGB	BX318	$38.00
Microwave Handbook Vol 2 — RSGB	BX437	$57.00
Microwave Handbook Vol 3 — RSGB	BX447	$57.00
Microwave Update Conference 1987 — ARRL	BX174	$17.50
Microwave Update Conference 1988 — ARRL	BX183	$17.50
Microwave Update Conference 1989 — ARRL	BX321	$24.00
Microwave Update Conference 1991 — ARRL	BX446	$24.00
Mid Atlantic VHF Con. October 1987 — ARRL	BX175	$16.50
Spread Spectrum Source Book — ARRL	BX385	$40.00
UHF Compendium Part 1 & 2 Vol 1	BX250	$75.00
UHF Compendium Part 3 & 4 Vol 2	BX251	$75.00
UHF Compendium Part 5 German only	BX254	$62.50
UHF/Microwave Experimenters Manual — ARRL	BX325	$40.00
UHF/Microwave Experimenters Software — ARRL	BX327	$20.00
VHF 21st Central States Con. 1987 — ARRL	BX172	$16.50
VHF 23rd Central States Con 1989 — ARRL	BX288	$16.50
VHF 24th Central States Con. 1990 — ARRL	BX322	$25.00
VHF 25th Central States Conference 1991 — ARRL	BX438	$25.00
VHF 26th Central States Conference 1992 — ARRL	BX448	$25.00
VHF West Coast Conference 1992	BX444	$25.00
VHF/UHF 18th Eastern Conference — ARRL	BX445	$25.00
VHF/UHF Manual — RSGB	BX267	$48.00
WIA MEMBERS SUNDRIES		
Log Book Covers		$16.00
WIA Badge — Diamond		$4.00
WIA Badge — Diamond With Call Sign Space		$4.00
WIA Badge — Traditional Blue		$4.00
WIA Badge — Traditional Red		$4.00
WIA Car Window Stickers		$0.50
WIA Car Bumper Stickers		$0.50
WIA Tape — Sounds of Amateur Radio		$7.00
WIA PUBLICATIONS		
Australian Radio Amateur Call Book — 1993		$11.00
Band Plans Booklet		$2.80
WIA Log Book — Horizontal or Vertical Format		$5.00
WIA Novice Study Guide		$1.50

Not all of the above items are available from all Divisions (and none is available from the Federal Office).
If the items are carried by your Divisional Bookshop, but are not in stock, your order will be taken and filled as soon as possible.
Divisions may offer discounts to WIA members — check before ordering. Postage and packing, if applicable, is extra.
All orders must be accompanied by a remittance.
The prices are correct as at the date of publication but, due to circumstances beyond the control of the WIA, may change without notice.

Divisional Notes

Forward Bias — News from the ACT Division

Chris Davis VK1DO

Approximately 50 members of the ACT division have filled in the survey of members' services which was finalised early in May. An overwhelming number of members have voted in favour of moving our broadcast times to be principally originating on a Monday night, with a repeat on just the 2m band one or two nights later

The spread of preferred frequencies held two metres as the most popular, with 80 metres followed by 70 centimetres as a listed preferences by a few in addition to two metres. It is intended to move our broadcast time commencing on the first Monday in June with 3.570, 146.95 and 438.525 MHz at 8pm local time. A repeat of the broadcast will take place on the Wednesday following Please note that in the case of the fourth Monday, when members are involved at a monthly meeting, there will be no broadcast on the Monday, only a 146.95 MHz broadcast on the following Wednesday.

Opinions on the role of the office were quite varied, with many local members admitting they did not have an opinion either way. Many voted in favour of us continuing with the office providing greater use is made of it both by members and in terms of increased facilities.

Some positive reactions were received in response to the invitation to be involved in scripting, reading and engineering our local broadcasts, with some very positive feedback and constructive criticism. As soon as is practicable, the roster of personnel involved in all areas of the weekly broadcast will be steadily increased

The general consensus in relation to book sales etc recognised that we could not continue to subsidise such high stock; however, an order-only basis was favoured, perhaps with some increased emphasis on technical stocks which could not be accessed elsewhere. In view of the intention to retain the office, the inclusion of some range of parts, kits or the like might be a compatible service to refine in response to member demand.

Although the great majority of members favoured both the retention of the office and the continuation of promotional activities, the actual expressions of willingness to help still falls to the same handful. It is an endemic phenomenon in all organisations that a handful do the majority. However, I must say on behalf of those who pitch in that we do enjoy ourselves and look forward to having others participate and share in the fun! We simply don't want to seem selfish!

Our June meeting will be totally occupied by a tour of the transmitter and studios of radio station 2CC, courtesy of Jim VK2UZ. Members are asked to assemble at the station in Bellingden Rd, Gungahlin, for an 8pm start. Members who normally travel to the Griffin Centre by bus or other means, can rely upon transport from members of the committee who will be meeting in the committee room until approximately 7.30pm, and will be in attendance until about 7.45pm for anyone needing a lift.

We look forward to seeing you at our technical tour.

Christopher Davis

VK2 Notes

Tim Mills VK2ZTM

Coming Events

This month over the holiday weekend the annual Oxley Region ARC Field Day at the new venue of the Wauchope Showground ... The next Divisional exams at Parramatta will be conducted during August ... The next Trash and Treasure is set down for Sunday afternoon 25 July.

Happenings

A new radio club was formed recently in the Parramatta region They meet at this stage on the first and third Friday evenings by arrangement at Amateur Radio House. Contact details are available from the office. See directory on page 3 for phone numbers.

Input to the next Callbook closes soon. Do you have any updates, callsign changes, corrections etc? Write, fax or call the Divisional Office now. Likewise any corrections to repeater listings, advise now.

In line with current trends, Divisional Council recently reviewed the non-smoking rule within any Divisional building. They reaffirmed the request that no smoking was permitted within any enclosed part of either Divisional property.

A reminder that the Division has VHS copies of most of the lectures on video held by the Federal video library. A list is available from the office, together with borrowing details.

The deadline for these notes occurred prior to the deferred AGM. The meeting report will be included in the next available issue.

5/8 Wave

Rowland Bruce, VK5OU

The Division held its Annual General Meeting at the Burley Griffin Building in Thebarton on April 27th There was a total of thirty-five members present when I opened the meeting, standing in for President Bob Allan, VK5BJA, who was unable to attend. This number increased steadily to forty-seven as the evening progressed. Both the President's report and the Treasurer's report will be published in the next issue of the Journal. Maurie VK5EA, presented reports as Secretary and membership secretary and John VK5ZHR, the Intruder Watch report.

The 1993/4 Council is:
Bob Allan, VK5BJA, President.
Maurie Hooper, VK5EA, Secretary.
Bill Wardrop, VK5AWM, Treasurer, ex officio Federal Councillor.
Ian Watson, VK5KIA, ex officio WICEN Director.
Rowland Bruce, VK5OU, ex officio Immediate Past President.
Gary Herden, VK5ZK.
Don Wilton, VK5KDW.
John McKellar, VK5BJM, co-opted.
Phil Pavey, VK5BHN, co-opted.
Grant Willis, VK5ZWI, co-opted.

Several proposed alterations to the Constitution, previously published, were adopted and they also will appear in a future edition of the Journal, together with a reprint of the 1986 changes, which will allow members to update their copies until a new issue is published.

Amateurs have been in the public eye recently. Their presence was commented upon during the TV coverage of the ANZAC Day march, and several helped man the Exhibition station, VI5MIR, the mock-up of the Russian Space Station, including VK5's WC LV AZN ZAI AW and CF and no doubt others of whom I am unaware as yet. Thanks for the work and good publicity.

Finally, this month, welcome to the following new members of the Division. May your association with WIA and radio generally be a long and happy one.
Iain Fraser, VK5ZIF
Laurie Gill
Joan Harris.
Al Rechner, VK5EK.
A. Ross, VK5ZRA
Brenton Zerbe, VK5BZ
John Cashen, VK5AI
Peter Cockburn, VK5TZX.
Ron Johnson, VK5AKJ. **ar**

QSLs from the WIA Collection

Ken Matchett VK3TL *

The Senior Service — Part 3 ZC4HMS

Members of the RNARS are scattered all over the globe. There are several stations operating from British bases and ships. For example, VQ9RN (RNARS 665) from Diego Garcia in the Chagos Archipelago operated in June 1986 on Gulf patrol aboard HMS Southampton. Station VS1CH operated from the Royal Navy radio station on Singapore Island. Station ZB1AB was active from HM Dockyard on the George Cross Island, and ZB2BO from HMS Rooke on Gibraltar. A considerable number of navy personnel operate from the UK Sovereign Base on Cyprus. The ZC4HMS QSL shown celebrated 30 years of the Royal Navy 1960-1990.

SL8CKR

Most DXers will be familiar with the specially allocated Swedish station callsign with SK and SL prefixes. These originate from military, air force and naval stations holding amateur radio licenses. The SL8CKR QSL featuring the HMS Carlskrona of the Royal Swedish Navy is such an example.

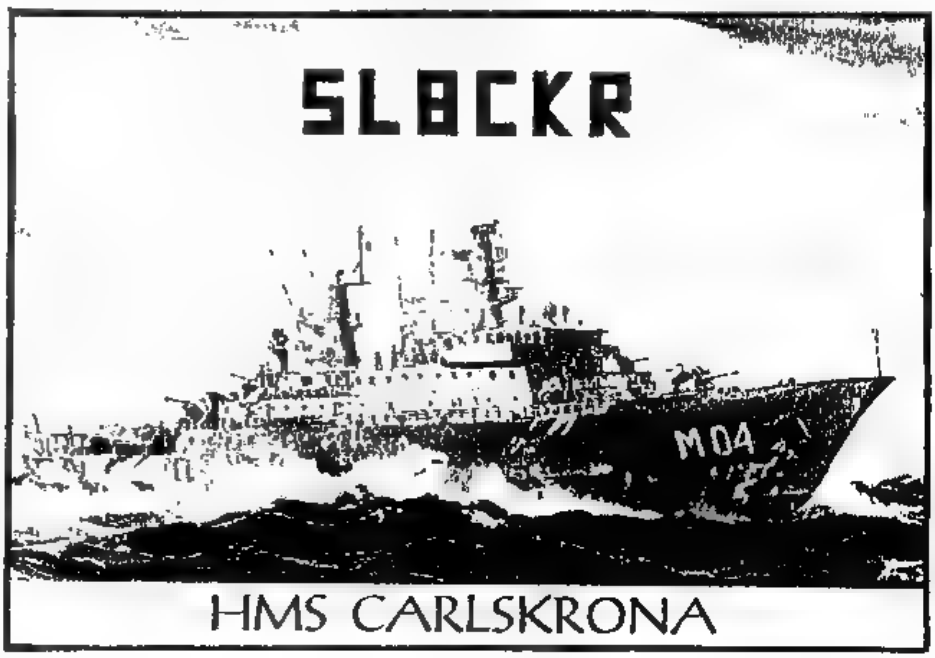
Many other foreign countries issue callsigns (some with special prefixes or suffixes) to naval personnel and establishments. These are mostly radio clubs and maritime schools and colleges. Stations ZL2RN (NZ Branch HQ of the RNARS), LJ2D (Norwegian Naval Club), ON6ZM (HQ station of Public Relations, Belgian Navy), OH1AJ (Finnish Navy Club), PI1ARS (Royal Dutch Navy Club station), F6KSV (French Naval Officers' Club), HC2BEG (Ecuadorian Navy) are but a few examples.

QSLs from the United States have shown a very large number of activities associated with naval forces, and are so numerous that only a short account can be given here. There are especially allocated callsigns of both the US Coast Guard stations and ships identified by the callsign suffix, eg W1CGS, KC4USG. Also there are numerous QSLs from naval bases, naval reserve stations and naval schools. Many are on the US mainland, but several have been sent from overseas countries, many with special callsigns, eg ET3USN Eritrea, JA2MB Marine Barracks, Japan, KZ4USN Panama Canal Zone, KX6USN Marshall Islands, KR6US Okinawa and so on. American naval personnel at Subic Bay naval base in the Philippines, Pearl Harbour, Hawaii, Guantanamo Bay and Antarctic bases and other centres have all indicated their naval interests on their QSL cards. American amateurs have also been most active in maritime mobile operations from a great variety of vessels including Coast Guard cutters, submarines and aircraft carriers.

DL0MF

Several German and Austrian QSLs show their owners to be members of the "Vereinigungnoch Funkender Ehemaliger Marinefunker", a union of marine telegraphists. The training vessel "Gorch Fock", a sailing ship, appears on each QSL card. Like members of the RNARS, each member displays his or her membership number on the QSL. The QSL shown, DL0MF, is that of the club station.

Strangely enough, there are very few QSLs depicting Russian naval activity despite the fact that great deeds of the former USSR are well represented on QSLs from Russian radio amateurs and short-wave listeners. Possibly the only ones that come readily to mind are those showing the Russian battleship Potemkin on those cards which celebrated the 1917 revolution in which the Russian Navy played an important part.



Many readers will be familiar with the special Canadian callsign prefix, VE zero, used for Canadian ships and maritime mobile operations. Most are of attractive design showing ships of various kinds. Amongst these may be found VE0NWC, an anti-sub ship, VE0NEF, a Coast Guard vessel, VE0NWA, a destroyer escort, and VE0MC, a Canadian weather ship.

A number of QSLs from Italy display naval ships of various types. Most are sent by members of INORC (Italian Navy "Old Rhythmers" Club), a club formed by former ship radio officers. Many give details of their war service with the Italian Navy. For example, the operator of station IT9ZNM states he was "Chief Radioman" aboard the battleship "Andrea Doria". He also is a RNARS member. No matter what one's country or allegiance, the originators of each of the QSLs referred to in this series of articles on the Senior Service share one thing in common — a past and present love of the sea.

Author's Note:

Over the past few years these articles on the stories behind QSLs in the WIA collection have given some examples of both the occupations and interests of radio amateurs. Scouting, Red Cross, Olympic Games, Rotary and the Navy have already been dealt with. Future articles are planned for Army, Air Force, Signals, Schools and Universities, Fire Services, Astronomy, Handicapped Persons, Royalty, Police, Railways, Religion, Fine Arts and Sport to name just a few. Readers possessing QSLs or information on amateur radio activity in any of these fields are invited to contact the author in order that local information in particular can be incorporated into the articles.

Thanks

The WIA (Vic Div) would like to express its appreciation to the following for their kind donations of QSL cards: (Supplementary list)

Dick	VK4GOR
Terry	VK2ALG
Peter	ex-MP4BBA
Mike	G7EUL
Pete	KK4VN
Vic	VK5AGX
Wolf	OE1WHC

* 4 Sunrise Hill Road, MONTROSE VIC 3765
Ph. (03) 728 5350

Technical Correspondence

Norman Burton L20992
130 The River Road
Revesby NSW 2212

Broad Band RF Amplifiers

I am unable to agree with your remarks at the bottom of the first column on P20 of AR for April

There were many broadband RF amplifiers used in valve receivers and I have reproduced four below.

Eddystone used to publish circuits that could be built up from mainly Eddystone parts, and it was common for them to use a broadband RF amplifier ahead of the reacting detector They usually used an RF choke and with their receivers using plug-in coils, one could tune the range from 140 kHz to over 32 MHz. I would call this broadband, wouldn't you?

The Navy receiver used in WWII and built by AWA, type 1-C6940 used a broadband amplifier over its lowest range, whilst the Marconi CR300 used a broadband filter to cover its lowest range, 14-80 kHz. I had at one time in one of my cars, a Smith's radio which covered the broadcast band, and used a broadband filter in the front end, so allowing only the oscillator to be slug tuned.

One of the best known broadband receivers was the Wireless World "Single Span" which covered the broadcast band and European long wave band in one fell swoop, so eliminating band switching. It used an IF of 1600 kHz.

Many American broadcast band receivers of the late '20s and very early '30s used a broadband RF valve, and many of the designs published by the radio magazines of the '30s and on, in which sets were described for home construction and for use on short wave, as it was called, used a broadband RF amplifier valve using either choke or resistance in the grid circuit.

I think these examples are enough.

As to the article at whose end your comments appear, I'm not quite sure what the author is driving at; front-end selectivity to me means tuned circuits which give the double benefit of adjacent channel selectivity and prevention of first-stage overload, and he doesn't seem to mention these.

The weakness of the solid state front end is that no-one has been able to produce a solid-state equivalent of the variable mu valve, when they do, front-end problems will be over.

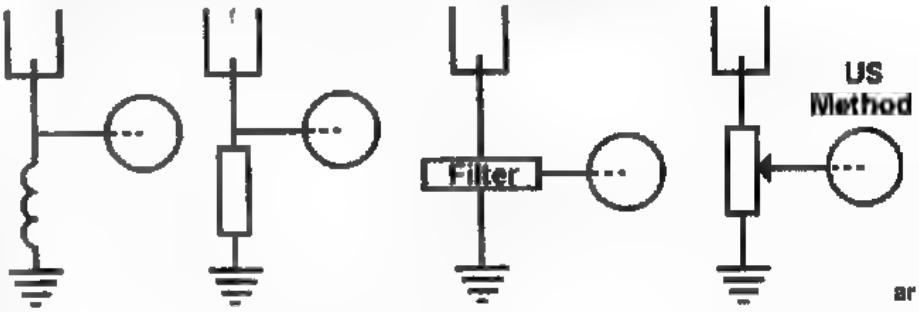
I have spent all my amateur life with receivers and receiver design and am far from impressed with the front-end performance of many modern communication receivers, the broadband front end is a problem producer, which is why I stick to valves for serious listening.

I have an excellent solid-state receiver with a tuned front end, which is supposedly tuned down to VLF, but below 500 kHz its performance is, and this is flattering, woeful. My 45-year-old Marconi CR200 runs rings around it, and it's not even a superhet!

It's comments like yours that keep us OTs on our toes!

EDITOR'S REPLY:

I am forced to admit that the original footnote was somewhat dogmatic! Perhaps it would have been better to say "more difficult" rather than "impossible". Nevertheless, because of their lower input impedances than valves, but similar order of capacitance, transistors do fit better into broadband systems needing significant gain ... VK3ABP.



ar

Pounding Brass

Gilbert Griffith VK3CQ *

Every few years or so, at least here in Australia, an event known as "The Great Morse Debate" rears its head. The last couple have reared their heads all over the packet bulletin boards much more than in the magazines. It seems though, that other countries do not have the same ordeals with "silly season" as we do here.

Writing his "Morseman" column for "Break-In" magazine in NZ, Gary Bold gives the following reflections on the "Great Debate" from Michigan, in the US, where he temporarily resides.

"The Morse/anti-Morse debate has never risen in the US to the level of fury and emotionalism it has in ZL. There is simply no major movement calling for its abolition. Indeed, the contrary often seems to be the case. For example, here's an extract from a resolution adopted by the board of the ARRL, in January 1993.

"WHEREAS: Morse Code is the international language that fosters communications between peoples with different languages, and

"WHEREAS: Knowledge of the Morse Code has, for decades, proven to be of positive value to the Amateur Radio Service worldwide; now therefore, the American Radio Relay League strongly

"REAFFIRMS its continued support for a demonstrated proficiency in the international Morse Code as part of the licence requirement below 30 MHz, and

"INSTRUCTS all ARRL representatives to continue to insist before all national and international bodies that there be no modification to the present proficiency requirement."

Now the ARRL is felt by many to be a conservative voice in US Radio politics. Nevertheless, many support it, and it has considerable influence. I don't think the international Morse requirement will be zapped before the ARRL stance changes.

My own opinion is that emotionalism belongs to music, movies, marriage and so forth. There are a great many things I would like to take part in, for instance, I would really love to fly a jet, drive a formula 1 racing car, fly a helicopter (etc etc ad nauseam) but for so many of these things there are criteria that must be satisfied first. So unless you are prepared to break the law, you will need the qualifications in order to enjoy the benefits.

With regard to Amateur Radio, I saw that eligibility required a knowledge of theory, regs and Morse, so naturally I set about learning enough to pass the exams.

It did not occur to me at the time that if enough people got together they could change the law, and now I am sure that the ideals and tradition of the Amateur Radio fraternity could be changed in this manner. But it would need to be called something like "Democratic Public Radio", because it wouldn't be Amateur Radio any more.

* *7 Church Street, Bright Vic 3741*

Contests

*P Nesbit VK3APN — Federal Contest Coordinator **

Contest Calendar June-July 93

Jun 5/6	RSGB Field Day CW (May 93)
Jun 12/13	ANARTS WW DX RTTY (May 93)
Jun 12	VK/ZL/P29 80m Sprint (May 93)
Jun 19/20	WIA Novice Contest (May 93)
Jun 26/27	ARRL Field Day(May 93)
Jun 26/27	RSGB 1.8MHz Contest
Jul 1	Canada Day CW/Phone
Jul 3	Australasian 80m CW Sprint
Jul 3	NZART 80m Memorial CW/Phone
Jul 3/4	Venezuela SSB DX
Jul 10	Australasian Phone Sprint
Jul 10/11	IARU HF Championship
Jul 10/11	CQ WW VHF WPX Contest
Jul 11	Jack Files Memorial (Phone)
Jul 17	Colombian Independence Day
Jul 17/18	South-East Asia DX Contest
Jul 24/25	Islands On The Air Contest
Jul 24/25	Venezuela CW DX Contest
Aug 1	Jack Files Memorial (CW)
Aug 7/8	YO DX Contest
Aug 14/15	Worked All Europe CW
Aug 14/15	SARTG RTTY Contest
Aug 14/15	SEANET SSB DX Contest

Some more Australian sprints are coming up over the next couple of months. The main feature of a sprint is its limited duration, so that scores depend more on the number of QSOs which can be made in a short period of time, rather than transmitter power or antenna gain. Consequently one can be very competitive without having a super-dooper station, and the impact on family life is minimal. To further whet your appetite, this year NZART's 80m Memorial Contest coincides with the VK5/8 CW Sprint on 3 July, creating an opportunity for plenty of VK/ZL QSOs. If you haven't yet tried a sprint, why not give it a go?

Until next month, good contesting!

73

Peter VK3APN

Contest Details

The following contest details are supplemented by the "General Rules & Definitions" published in April AR.

Canada Day CW/Phone

July 1, 0000z-2359z Thursday.

This contest celebrates Canada's confederation, and occurs on the first of July each year. Bands 160-10m, CW and Phone. Suggested frequencies are (CW) 25 kHz up from the band edge, and (SSB) 1850, 3775, 7075, 7225, 14175, 21250, 28500. Check for CW activity on the half hour. Any station can work any other for QSO credit. Exchange RS(T) and serial number; Canadians will send RS(T) and province/territory. Score 10 points for Canadian QSOs including VE0 (ie maritime mobile), and 2 points for others. Canadians with RAC, VCA or QST suffixes are worth 20 points. Multiplier is Canadian provinces and territories (max 12), and count once per band and mode: VO1/2 (Newfoundland); VY2 (Prince Edward Isl); VE1/CY9/CY0 (Nova Scotia, Sable Is, St Paul Is); VE1; VE2; VE3; VE4; VE5; VE6; VE7; VE8; VY1 (Yukon). Final score is QSO points x multiplier. Send log and summary sheet in standard format, including dupe sheet, by 31 July to: "RAC, PO Box 356, Kingston, Ontario, K7L 4W2, Canada".

Australasian 80m Sprint (CW/Phone)

July 3 (CW), July 10 (Phone); 1100-1159z Sat.

This contest is organised by the Adelaide Hills Amateur Radio Society, and is co-sponsored by the VK5/8 Division of the WIA. The object is to make (and SWLs to hear and log) as many contacts with amateurs in VK, ZL and P2 as possible, without duplication, on 80m during a 1 hour period. Groups of amateurs using a single callsign, e.g. clubs, are also eligible. Frequencies are 3500-3700 (CW) and 3535-3700 (phone). Call "CQ Sprint", "CQ Contest" or "CQ TEST". Exchange RS(T) and serial number starting at any number between 001 and 999. Revert to 001 if 999 is reached.

Logs and summary sheets should be in standard format (see "General Rules & Definitions", April AR), and sent to: "AHARS, PO Box 401, Blackwood, SA 5051" to be received by Friday August 13. Endorse the envelope CW Sprint, Phone Sprint, or SWL Sprint. Certificates will be awarded to the highest scoring station (and SWL) in each VK, ZL, and P2 call area in both the CW and Phone sections. Trophies will be awarded to the outright winners of both. A certificate will also be awarded to the highest scoring Novice entrant in the CW Sprint, providing that the recipient is not entitled to another CW Sprint award. Other awards may be made at the Contest Manager's discretion. Standard disqualification criteria apply, and the Contest Manager's rulings and decisions are final.

David Box VK5OV
AHARS Sprint Contest Manager

NZART 80m Memorial Contest (CW)

July 3, 0800z-1400z Sat.

Australian amateurs are invited to join with amateurs from New Zealand in this yearly 80 metre contest to commemorate those from our ranks who lost their lives in World War II. It is open to single operator stations in the 80 metre band, and mobile operation is permitted.

The contest has six operating periods, each of one hour, from 0800z-1400z. A station may be contacted TWICE during each operating period — once on Phone and once on CW, providing that such contacts are not consecutive.

Exchange RS(T) plus serial number commencing at any number between 001 and 300 for the first contact. On phone, score 15 points for the first QSO with a scoring area, 14 points for the second QSO with that area, descending to 1 point for the 15th and subsequent QSOs with that area. The same scoring system is used for CW, except that QSO points remain at 5 for the 11th and subsequent QSO with that scoring area. Scoring areas are DXCC countries, and VK and ZL call areas. The rules for SWL entrants are similar except that the callsigns of the stations heard and being worked must be given, and only the cipher of the station heard is required.

Logs and summary sheets should be in standard format (see "General Rules & Definitions") and sent ASAP to: "Memorial Contest, PO Box 20 332, Auckland 7, New Zealand". Include a points summary showing the number of QSOs and points for each ZL call area. Certificates will be awarded to the top 3 scoring VKs.

Venezuela CW/SSB DX Contest

July 3/4 (SSB), July 24/25 (CW); 0000z Sat to 2400z Sun.

This is the 32nd annual contest celebrating Venezuela's independence. It is a world-wide contest, ie work both YV and other stations. Bands 80-10m. Categories are: single operator, single and all band; multioperator, single and multitransmitter.

Exchange RS(T) and serial number. Score 1 point for QSOs with own country, 3 points for QSOs with other countries in same continent, and 5 points for QSOs with other continents. Multiplier equals YV call areas plus number of countries worked (including own country) on each band. Final score is total QSO points from all bands x sum of multipliers from each band.

Include 2 IRCs or the equivalent to cover the cost of processing and mailing any awards. Send logs by September 30

(SSB) and October 31 (CW) to. "Radio Club Venezolano, Concurso Independencia, PO Box 2285, Caracas 1010-A, Venezuela"

IARU HF Championship

July 10/11, 1200z Sat to 1200z Sun.

This contest runs on the second full weekend of July each year Bands 160-10m Categories are single operator, CW only, phone only, mixed; multioperator single transmitter mixed mode only. Multioperator stations must remain on a band for at least 10 minutes at a time (exception: IARU member society HQ stations may operate simultaneously on more than one band with one transmitter on each band/mode, providing only 1 HQ callsign per band is used)

Exchange RS(T) and ITU zone (Note: ITU zones are NOT the same as the CQ zones used in most other contests. In our region they are P2 = 51, VK4/8 = 55, VK6 = 58, and VK1/2/3/5/7 = 59). HQ stations will send RS(T) and official society abbreviation.

Claim 1 point for QSOs within own zone or with an HQ station, 3 points for QSOs with different zone in own continent, 5 points for QSOs with different continents. Multiplier is total ITU zones plus IARU HQ stations worked on each band (note: HQ stations do not also count for zone multipliers). Final score is total QSO points from all bands x sum of multipliers from each band. Standard log format, dupe sheet for 500+ QSOs.

Send logs postmarked by August 11 to: "IARU HQ, Box 310905, Newington, CT 06131-0905, USA". Official forms and an ITU zone/prefix/continent map can be obtained from the same address on receipt of a large SASE with 2 IRCs or equivalent. Certificates to the top scorers in each category, in each state, ITU zone, and DXCC country. Also, stations with 250+ QSOs or 50+ multipliers will receive achievement awards.

Sunshine State Jack Files Memorial Contest

11 July (Phone), 1 August (CW); 0800-1300z Sun.

This contest honours the late Jack Files, a long-time VK4 WIA Councillor. The object is to encourage amateurs to work VK4s for the "Worked All Queensland" and other awards, to encourage portable/mobile activity from the less populated VK4 towns and shires, and to warm-up for the RD contest.

Categories are: Home VK4, Portable/Mobile VK4, Club Fixed VK4, Club Portable/Mobile VK4, VHF VK4, and all non-VK4. Bands are 3.5 and 144 MHz. Suggested calling frequencies are 3570-3595 (phone), and 3525-3550 (CW). On phone call "CQ Jack Files Contest", and on CW "CQ JF" or "CQ TEST". Exchange RS(T) plus serial number starting at 001. VK4 stations will add the code letters of their city/town/shire (see below), and club stations will also add "Club" or "Club Station". Club stations may use multiple operators providing there is only one transmitter operating at a time. Home stations may be reworked after 1 hour.

Mobile/portable stations are exempt from the one-hour rule when operating from a different city/town/shire. When operating within 1 hour from that of previous operations, they are regarded as "new" stations for scoring purposes. (Different is not to be taken as alternating, i.e. operating from Area A for 50 mins, then Area B for 50 mins, then Area A, would be considered alternating, not different). Operations from the same city/town/shire after 1 hour, regardless of movements within that area, are regarded as home station operation. Mobile stations should have drivers or log-keepers for road safety purposes.

Score 5 points per QSO with a VK4 station. Bonuses are 10 points for the FIRST contact with a city/town/shire in VK4 or VK6, and 10 points for each club station EACH TIME it is worked.

In the past, some mobile/portable entrants have devised ingenious interpretations to the rules. Such efforts are encouraged, provided normal operating etiquette and licence conditions are complied with. Share your ingenuity with the Contest Manager when submitting your log.

"One can be very competitive without having a super-dooper station."

After the Contest, participants are invited to enter a callback on 3575+/–QRM (phone) or 3535 (CW), to give preliminary results, share experiences, and make suggestions for next year's contest.

Awards include participation certificates to ALL stations submitting logs, certificates to the highest scorer(s) in each section, and where returns justify, second and third place certificates. A trophy may be awarded for outstanding effort, at the Contest Manager's descretion.

Logs and summary sheets should be set out in the standard way (see "General Rules and Definitions"). Mobile/portable entrants should include on the summary sheet the number of Cities/Towns/Shires operated from, and if possible a separate map or sketch showing the route and/or locations used. Submit logs to: "VK4 Jack Files Contest Manager, Bruce Bussenschutt VK4OR, 2 Dewrang Place, Wurtulla, Sunshine Coast, Queensland 4575", on or before 13th August 1993.

VK4 City/Town/Shire codes are as follows:

AL Albert; AA Allora, AC Aramac, AN Arakun (R); AT Atherton; BL Balonne; BA Banana, BC Barcaldine; BO Barcoo, BH Bauhinia; BT Beaudesert; BY Belyando; BD Bendemere; BG Biggenden; BX Blackall, BV Boonah; BO Booringa; BZ Boulia; BW Bowen; BN Brisbane*; BS Broadsound; BP Bulloo; BU Bundaberg*; BI Bungil; BK Burdekin; BR Burke, CB Caboolture, CS Cairns*; CL Calliope, CA Caloundra*, CM Cambooya, CD Cardwell; CP Carpentaria; CT Charters Towers*; CH Chinchilla; CF Clifton; CY Cloncurry; CK Cook; CN Crows Nest; CR Croyden; DY Dalby*; DL Dalrymple; DI Diamantina; DG Douglas; DU Duaringa; EA Eacham; ED Eidsvold; EM Emerald, EK Esk; ET Etheridge; FZ Fitzroy; FL Flinders; GT Gatton; GH Gayndah; GD Gladstone*; GL Glengallan; GC Gold Coast*; GM Gooburrum; GI Goondiwindi*; GY Gympie*; HT Herberton; HB Hervey Bay*; HK Hinchinbrook; IL Ilfracombe; IW Inglewood; IP Ipswich*; IS Isis; IF Isisford; JE Jericho; JO Johnstone; JY Jondaryan; KY Kilcoy; KK Kilkivan; KG Kingaroy; KO Kolan; LA Laidley; LV Livingstone; LC Logan*; LO Longreach; MC Mackay*; MA Mareeba; MO Maroochy; MB Maryborough*; MK McKinlay; ML Milmerran; MN Mirani; MV Miriam Vale; MT Monto; MR Moreton; MZ Mornington (R); MI Mt Isa*; MM Mt Morgan; MG Mulgrave; MU Mundubbera; MY Murgon; MX Murilla; MH Murweh; NN Nanango; NE Nebo; NO Noosa; PO Paroo; PD Peak Downs; PY Perry; PR Pine Rivers; PI Pioneer; PT Pittsworth; QL Quilpie; RC Redcliffe*, RD Redland; RI Richmond; RH Rockhampton*; RM Roma*; RO Rosalie; RL Rosenthal; SA Sarina; ST Stanthorpe; TB Tambo; TA Tara; TM Taroom; TH Thuringowa*; TI Tiaro; TO Toowoomba*, TE Torres; TV Townsville*; WG Waggamba; WO Wambo; WR Warroo; WA Warwick*; WH Whitsunday, WE Widgee, WI Winton, WD Wondai, WC Woocoo, WN Woongarra.

(R) = restricted area for radio transmission (Shire entry permit required)

* = City or Town (15 required for Worked All Cities and Towns Award. Send SASE to Contest Manager for details of these parts of the Worked All Queensland Award. Work 51 of the 111 shires for the VK4 Worked All Shires Award

Bruce Bussenschutt VK4OR
Jack Files Contest Manager
*** 24 Sovereign Way, Avondale Heights, 3034.*

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Club Corner

Hervey Bay Amateur Radio Club Inc

Just a short note letting you and your readers know that the Hervey Bay Amateur Radio Club Inc is still active but, owing to the ebb in propagation, this year we will not be activating any special award during our annual Hervey Bay Whale Festival. Instead, we will be calling CQ CQ, to all and sundry, on a 24-hour basis for the first seven days in August 1993, hoping to exchange cards with operators in as many different countries as possible.

The frequencies used will be as close to these as possible. 3.794, 7.100, 14.235, 21.250, 28.495 MHz, all +/– QRM of course; also Australian novice frequencies will be used as much as is possible, bands permitting.

For the information of any operators who made contact with either VI4HBW in 1992, or VI4FOW in 1992, which were two entirely different awards, there are still limited supplies of both awards available. The normal five green stamps secures either of these rather magnificent enlarged photographs of hump back whales at play. Together they make a very nice display for the shack wall.

Also, while on the subject of QSL cards, in November 1991 some members of our club activated Fraser Island OC142. We made some 4500 contacts in eight days, we still have quite a lot of these specially printed cards left, so any island chasers who made contact with us are still able to obtain their verification QSL card for the price of return postage. If you can see your way clear to put the relevant parts of this information into print in your magazine it will allow us later on this year to close the logs with the thought that we have done our best for AR. Incidentally, we are still receiving QSL cards through the bureaus, and because of backlog in some countries, it is to be expected that this will continue for some time.

Application for any of these awards and/or QSL cards may be sent to The QSL Manager, HBARC Inc, PO Box 829, Hervey Bay, Queensland 4655, Australia. Please rest assured that all are answered, 100 per cent.

Thank you for your time and trouble, and I trust you are having a very happy and successful 1993.

Jim White VK4BX
Secretary HBARC Inc
PO Box 829
HERVEY BAY, Qld 4655, Australia.

Dentist Amateurs

No — not amateur dentists (what a frightening thought!) but dentists who are licensed amateurs may wish to note this item.

The Japan Dental Ham League (JDHL), which has 130 members, has suggested the setting-up of an international personal computer network to extend its present JDHL Net "In order to make a world intelligence network for dentists"

Interested? Contact Dr Colin Wall VK2JC, executive director of the Australian Dental Association, at PO Box 520, St Leonards 2065; or Fax (02) 902 4676.

South Coast Amateur Radio Club News

The South Coast Amateur Radio Club Inc would like to invite you to attend the inaugural "South Australian technical Symposium". This event will be held in Adelaide on Saturday 24 July 1993, and is open to anyone with an interest in radio and electronics.

The aim of this event is to promote experimental and home-brew aspects of amateur radio today. Thirteen lectures will be presented covering a wide range of topics. Further to last month's information, we can now announce that our special guest lecturer will be Leigh Baker VK3TP, the WIA Federal WICEN co-ordinator. Leigh will speak on WICEC and its roles in amateur radio and the community. Other topics include:

160m Home Brew Equipment (John VK5BJE)
Amateur Microwaves (Des VK5ZO)
Packet Radio (Terry VK5GU and Grant VK5ZWI)
Short-Wave Listening (Jerome van der Linden)
Amateur Satellites (Graham VK5AGR and Garry VK5ZK)
6m-23cm Propagation (Eric VK5LP)
VLF/LF Techniques (Lloyd VK5BR)
VHF/UHF Construction and Equipment (David VK5KK)
Home-Brew Antennas (Peter VK5TZX)
Politics in Amateur Radio (Geoff VK5TY)

Many of the lecturers are planning demonstrations of equipment to complement their talks. Some of these include a display of 160m equipment, a live demonstration of microwave equipment and a chance to get some hands on experience driving a packet radio station. Visitors will also be able to see the VK5TTY Packet/RTTY Gateway BBS in operation.

The event will be held at the Kingston TAFE College, O'Halloran Hill in Adelaide. Lunch, morning and afternoon tea will be provided, as well as a copy of the notes from all lectures. The cost is $15. The presentations will be organised in three streams, allowing a choice of topics to be selected. The WIA (VK5 Div) Equipment Supplies Kits and Publications will also be available during the day.

If you are interested in attending, please register by 9 July, as seats are limited!!!

To register or obtain more information you can contact Grant Willis (VK5ZWI) on telephone (08) 277 3077 or Peter Cockburn (VK5TZX) on (08) 276 6703 between 7-9pm CST. You can also send a packet message to VK5ARC @ VK5TTY.#ADL.#SA.AUS.OC, or contact us by post at:

SA Technical Symposium
c/- South Coast ARC Inc
PO Box 333
MORPHETT VALE, SA 5162.

We hope to see you at the symposium!

Moorabbin and District Radio Club

Successful Handfest

The Club has a big problem — space! About 10 years ago the idea was conceived of holding a Trade Show in the club rooms during Show Week.

The idea was that country and perhaps interstate amateurs visiting Melbourne for the Royal Show could come to Moorabbin and see all the latest gear in one place instead of spending many hours travelling from dealer to dealer scattered around Melbourne.

The late Harold Webber, VK3PW, was the first organiser and it was a popular success. It soon outgrew the Club's fairly spacious facilities and a hired marquee was added. Trading in pre-loved gear had been added to Trade displays by this time and sales of used gear from the owner's car boot were encouraged. The date had now moved from September to May.

Wet weather quite literally dampened enthusiasm for this type of operation and for the next couple of years the assembly hall and some class rooms of a local school were used. Two years ago there was still not enough space and the venue was shifted to the large assembly hall plus a couple of class rooms at the Brentwood Secondary College in Glen Waverley where the latest, — 1st May - event was staged and very well organised by Trevor Armstrong (recently upgraded to VK3JJR) and a big team of helpers.

Well — what an event! There were extensive displays by a very representative group of eight traders. There were 52 separate hopeful sellers of pre-loved gear and this must have

weighed several tons. It had to be seen to be believed and, by golly, a heck of a lot of it changed hands.

The doors were open early for traders to move in their gear but the paying customers were held back until 10 am by which time over 100 prospective customers were milling around outside and the extensive parking facilities were steadily filling up. For the next three hours the place was crowded.

When Jim Linton, VK3PC, WIA Victorian President officially declared the show open at 11 am he described the event as the "Mother of Hamfests". In addition to the frenzied buying and selling there were displays by the Melbourne Packet Radio Group and the Melbourne Amateur TV group. Also represented were WICEN, the Australian Volunteer Coast guard, the St John First Aid and the ladies ALARA group.

Club officials estimate that more than 600 people passed through during the very successful day and it looks like we should try and find an even larger venue for May 1994.

Watch this space, especially if you missed out this year.

Allan Doble, VK3AMD.

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Awards

John Kelleher VK3DP Federal Awards Manager

In answer to many requests for a more difficult award to earn, I think I have to present one of the most difficult. It is the United States of America Counties Award, sponsored by CQ Magazine. It is issued for confirmed two-way radio contacts with specified numbers of US counties, under the following rules and conditions.

The USA-CA is issued in seven different classes, each a separate achievement as endorsed on the basic certificate by use of special seals for higher class. Also, special endorsements will be made for all one band or mode operations subject to the rules.

Class	*Counties Required*	*States Required*
USA-500	500	Any
USA-1000	1000	25
USA-1500	1500	45
USA-2000	2000	50
USA-2500	2500	50
USA-3000	3000	50

USA 3076-CA for ALL counties and Special Honours Plaque ($40)

USA-CA is available to all licensed amateurs everywhere in the world, and is issued to them as individuals for all county contacts made, regardless of calls held, operating QTHs or dates. All contacts must be confirmed by QSL, and such QSLs must be in one's possession for identification by certification officials. Any QSL card found to be altered in any way disqualifies the applicant. QSOs via repeaters, satellites, moonbounce and phone patches are not valid for *USA-CA*. So-called "team" contacts, wherein one person acknowledges a signal report and another returns a signal report, while both amateurs callsigns are logged, are not valid for *USA-CA*. Acceptable contact can be made with only one station at a time.

Unless otherwise indicated on QSL cards, the QTH printed on cards will determine county identity. For mobile and portable operations, the postmark shall identify the county unless information stated on QSL cards makes other positive identity. In the case of cities, parks or reservations not within counties proper, applicants may claim any one of adjoining counties for credit (once).

The *USA-CA* program will be administered by a CQ staff member acting as *USA-CA* Custodian, and all application and related correspondence should be sent directly to the custodian at his or her QTH. Decisions of the custodian in administering these rules and their interpretation, including future amendments, are final.

The scope of *USA-CA* makes it mandatory that special record books be used for application. For this purpose, CQ has provided a 64-page 4-1/4 × 11-inch record book which contains application and certification forms, and which provides record-log space meeting the conditions of any class award and/or endorsement requested. A completed USA-CA record book constitutes medium of basic application and becomes the property of CQ for record purposes. On subsequent applications for either higher classes or for special endorsements, the applicant may use additional record books to list required data or may make up own alphabetical list conforming to requirements. Record books are to be obtained directly from CQ, 76 North Broadway, Hicksville, NY 11801. It is recommended that two be obtained, one for application use and one for personal file copy.

Make record book entries necessary for county identity and enter other log data necessary to satisfy any special endorsements (band-mode) requested. Have the certification form provided signed by two licensed amateurs (general class or higher) or an official of a national-level radio organisation or affiliated club verifying the QSL cards for all contacts as listed have been seen. The *USA-CA* custodian reserves the right to request any specific cards to satisfy any doubt whatever. In such cases, the applicant should send sufficient postage for return of cards by registered mail. Send the original completed record book (not a copy) and certification forms and handling fee. Fee for non-subscribers to CQ is $US10 or 40 IRCs, for subscribers, the fee is $4 or 12 IRCs. Send applications to USA-CA Custodian, Dorothy Johnson, WB9RCY, 333 South Lincoln Ave, Mundelein, IL 60060, USA.

For later applications for higher class seals, send record book or self-prepared list per rules and $US1.25 or six IRCs handling charge. For application for later special endorsements (band/mode) where certificates must be returned for endorsement, send certificate and $US1.50 or eight IRCs for handling charges. Note: At the time any *USA-CA* award certificate is being processed there are no charges other than the basic fee, regardless of number of endorsements or seals; likewise, one may skip lower classes of *USA-CA* and get higher classes

without losing any lower awards credits or paying any fee for them.

[The Mobile Emergency and County Hunters Net meets on 14,336 kHz SSB every day. The CW County Hunters Net meets on 14,066.5 kHz daily]

Deletions (1)

The ARRL Awards Committee has voted unanimously to accept a recommendation of the DXAC to add Macedonia (4N5-YU5) for contacts made 8 September 1991 and after.

The Awards Committee also voted unanimously to accept a DXAC recommendation to delete Czechoslovakia (OK, OM) effective 1 January 1993.

Replacing Czechoslovakia, in accordance with DXAC recommendations, are the Czech Republic (OK-OL) and the Slovak Republic (OM).

At the time of going to press, many amateurs are awaiting the outcome of a referendum being conducted in Eritrea, which is attempting to regain country and DXCC status.

Deletions (2)

The following 54 stations, taken from the active WIA DXCC list, have been affected by the deletion of Abu Ail (A15, J2A etc).

VK1ZL	VK3OT	VK4BG	VK5MS	VK6PY
VK2WC	VK3OI	VK4DP	VK5OU	VK6RO
VK2AKP	VK3VU	VK4KS	VK5QW	VK6RU
VK2APK	VK3EWJ	VK4LC	VK5WO	VK6YF
VK2AVZ	VK3XB	VK4OH	VK5WV	VK6AJW
VK2BQS	VK3YJ	VK4QO	VK5XN	VK7AE
VK2FGI	VK3YL	VK4RF	VK5ARA	VK7BC
VK2VBL	VK3AKK	VK4UC	VK6HD	VK7LZ
VK3DP	VK3AWY	VK4VC	VK6HE	WA3HUP
VK3DU	VK3CSR	VK5BO	VK6LK	WB3CQN
VK3KS	VK3DYL	VK5EE	VK6NE	

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Spotlight on SWLing

*Robin L Harwood VK7RH **

Winter has arrived and the band conditions have also changed. Now we are getting strong signals on HF from Europe, the Mid-east and the Americas, during daylight hours. For example, I did hear Radio Tashkent in Uzbekistan on 15200 kHz at around 0249 UTC. The programme was in an oriental language akin to Russian, possibly Uzbeki but I am not certain. The religious broadcaster FEBA in the Seychelles, between East Africa and Sri Lanka, was heard on 15325 kHz, mixed in another station in Spanish. The programme at 0340 UTC was in Arabic but the audio was poor.

There is a station on 9350.4 kHz at 0415 UTC, broadcasting in Farsi, the language of Iran. Signals were good as was the modulation. I was not surprised to ascertain that it is a clandestine station. Overseas reports indicate that it is known as the "Voice of Human Rights in Iran", formerly "Iran's Flag of Freedom Radio". Speculation is that the sender was located in Egypt, but most HF broadcasts from Egypt usually have bad hum on their modulation. This isn't the case with the above signal.

Sri Lanka is an island off the southern tip of India and is about the same size as Tasmania. Formerly known as Ceylon, this nation is best known for the Tea which is grown on plantations. There has been serious political strife ever since the island gained its independence from Britain in the late forties. Political assassinations have frequently disrupted government there. Also there has been an ongoing civil war between the majority Sinhalese and the Tamils, who mainly are in the north and east.The Tamils are fighting for independence from Sri Lanka and want to be joined to the Indian state of Tamil Nadu.

This civil war has hit hard at the economy and as you may recollect, several international broadcasters have installed relay sites within Sri Lanka. The VOA were the first, then the Germans followed with a base at Tricomallee. This was right in the thick of the fighting with the Tamils. For about 18 months, the site was closed and only re-opened when the military regained control of the area. The Japanese also commenced broadcasting from the main site at Ekkala in the south, about the middle of 1992. You can hear them on 17820 kHz at around 0400 UTC in Japanese followed by English.

On the first of May, after being tipped off by a TV newsflash that the President of this nation had been injured in a bomb blast, I decided to tune in for the All Asian Service of the SLBC. At the best of times, signal levels are well down and this was no exception. However, it was clear enough for me to follow the English programme. They commenced with a solemn announcement that the president had been assassinated by a suicide bomber at 12 45 local time and that the Prime Minister had been sworn in as acting president. Nearby splatter increased to the point of swamping the signal. The All Asian Service of the SLBC can be heard on 9720 kHz at 1230 UTC with an English programme. This is a semi-commercial programme servicing South Asia. I can remember hearing this station on the 19 metre band at about 0200 UTC some thirty five years ago, when it was close to Radio New Zealand's channel.

"The programme was in an oriental language akin to Russian."

I recently had the opportunity of evaluating the Yaesu FT 747GX transceiver, particularly the General Coverage section of it. I was pleasantly surprised at the performance, compared to my Icom R70, although it was susceptible to electrical noise. This seems to come from inside the set possibly from the digital display or from the external power supply. Yet it wasn't that bad, compared to some I've heard. It is just that I am used to the quiet background noise of the Icom R70. The sensitivity was good as was the selectivity

I was particularly impressed with the width and IF shift control, which significantly reduced the channel splatter. Also tuning in to a signal, I was able to switch sidebands without altering the main dial. This was the first occasion I have been able to assess a transceiver with an inbuilt general coverage facility on receive, and I am impressed My thanks to Robert, VK2YRX, for his assistance.

Well, that is all for this month Don't forget, you can now contact on Packet as follows: VK7RH@VK7BBS or via the address below.

* *52 Connaught Crescent, West Launceston TAS 7250*

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Silent Keys

Due to increasing space demands obituaries should be no longer than 200 words.

The WIA regrets the passing of :

L A	Castelli	L20868
T W (Thomas)	Barnes	VK2ABI
J T (John)	Lake	VK2OK
D G (Dick)	Meerstadt	VK2RM
C W (Charles)	Crook	VK3PT
I (Ian)	Nally	VK3ZFH
K J	Callahan	VK4NQA

Dick Meerstadt VK2RM

Dick died on 6/4/93, aged 73. He saw service in the Dutch navy in World War II.

He was ill-treated as a prisoner of war, and his health was affected.

Dick and his wife Mary lived at Woodford in the Blue Mountains. In his 30 years of amateur radio Dick was a member of the WIA Blue Mountains branch, which later became the Blue Mountains Amateur Radio Club, in which Dick was a life member. He was also a member of the Royal Naval Amateur Radio Society.

Dick and Mary moved to Corindi Beach to enjoy retirement and became a member of the Coffs Harbour Amateur Radio Club. Dick's working life was at AWA and Ducon Pty Ltd. He was a great family man. To Mary and family we extend deepest sympathy.

Dennis St Ruth VK2EMF

Thomas William Barnes VK2ABI

Tom died on 20 April after a long illness.

He obtained his licence in 1935, and his main interest was in the HF bands.

Tom came to Australia at the age of seven with his parents. By determined night study at the Sydney Technical College whilst working with a gold-refining firm, he obtained qualifications which enabled him to become a lecturer in metallurgy at the Wollongong University.

Always cheerful and helpful to others, he will be sadly missed by his many friends. He is survived by wife Victoria, and children John, Phillip and Erica.

Jim Webster VK2BZD

John T Lake VK2OK

John Lake passed away at his home in Nambucca Heads on Thursday 6th May 1993. He had been ill for some time.

He served throughout and after World War 2 in the Australian Army, in "Sigs" at many levels and in many functions, including service in North Africa,Syria, Bougainville and the occupation of Japan.

Licensed by the Allied Military Government of Japan as JA5AI in 1948 he operated as one of the few Australian amateurs, largely, but not exclusively on 28 MHz. On return to Australia in 1951 he was allocated callsigns VK2OK, VK3UF, and again VK2OK.

In 1956 he retired from the Army, joined Mullard in Sydney until 1970, when he relocated to the mid north coast of NSW, the Macksville — Nambucca area. Until declining health forced otherwise he was active in amateur radio, particularly experimentation and construction, and his wife Barbara, in regional affairs.

He was named "Senior Citizen of the Year" by Nambucca Shire on Australia Day, 1991.

John was a conscientious and competent operator on HF, CW Phone and RTTY (the early days of Model 15s) and VHF FM. He was helpful, patient and courteous to all, possessed a keen, enquiring mind and well developed constructional skills. His great joys were to explore complex theoretical aspects reducing esoteric terms to meaningful English, particularly as Editor of the journal "Mullard Outlook" from 1958 to 1970, and in converting theory into practical, safe and durable items of electronic hardware.

Farewell friend, you gave more than you ever took.

Ted Mulholland, VK4AEM

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ALARA

Robyn Gladwin VK3ENX

Alarameet Update

We now have 75 names on the list but hoping for a few more. Saturday will be the main day, but if you can come to any part of the weekend, please do, as you will be most welcome. The West End Hall will be open from 9 am on both days for anyone to sit and chat; tea and coffee will be available all day. There will be ample time to talk. The tours are optional but will be confirmed when you return the acceptance form.

The City of Castlemaine, through its Tourist Information Centre, has provided a wealth of information for prospective visitors and we thank them for their support. The programme is as follows:

Friday Oct 1st

6.30 pm Optional counter tea Northern Hotel

Saturday 2nd

9.00 am Registration. Photo session.
11.00 am Official welcome.
12 noon Lunch.
1.30 pm Journey to Maldon Railway Station.
2.00 pm Steam Train Ride.
3.00 pm Free time in Maldon
7.00 pm Official Dinner at Castle Motel.

Sunday 3rd

9.00 am Tours of the area and visit to Buda, an historic homestead
12 noon Lunch
1.30 pm Official Closing Ceremony.

The Alarameet Co-ordinator, Margaret Loft, has worked very hard to finalise these arrangements and Alara members appreciate the efforts she has made. If you would like more information, her address is 28 Lawrence Street, Castlemaine, Victoria, 3450.

Gold Coast Ladies Group

This group is an adjunct of the Gold Coast ARS. The GYLs meet once a month at the Club Rooms and have plans to involve all members in events such as BBQs, river cruises, and theatre visits.

They intend to revitalise the Awards section of the main radio club by operating regular contacts using the club's fine equipment. There are YLs in the current training course, Novice and upgraders. The GYLs are hoping to make visiting YLs feel welcome, on air and in person, by taking part in the GCARS early morning net.

Resident Alara Cartoonist

Many thanks to Dorothy Bishop, VK2DDB, for her comments on the wonderful world of amateur radio.

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** Box 438 Chelsea 3196 VK3ENX@VK3YZW*

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Have you advised the WIA Federal Office of your new callsign? Use the form on the reverse of the Amateur Radio address flysheet.

HF Predictions

Evan Jarman VK3ANI

The Tables Explained

The tables provide estimates of signal strength for each hour of the UTC day for the five bands from 14 to 28 MHz. The UTC hour is the first column; the second column lists the predicted MUF (maximum useable frequency); the third column the signal strength in dB relative to 1 μV (dBU) at the MUF; the fourth column lists the "frequency of optimum travail" (FOT), or the optimum working frequency as it is more generally known.

The signal strengths are all shown in dB relative to a reference of 1 μV in 50 Ohms at the receiver antenna input. The table below relates these figures to the amateur S-point "standard" where S9 is 50 μV at the receiver's input and the S-meter scale is 6 dB per S-point.

μV in 50 ohms	S-points	dB(μV)
50.00	S9	34
25.00	S8	28
12.50	S7	22
6.25	S6	16
3.12	S5	10
1.56	S4	4
0.78	S3	2
0.39	S2	-8
0.20	S1	-14

The tables are generated by the GRAPH-DX program from FT Promotions, assuming 100 W transmitter power output, modest beam antennas (eg three element Yagi or cubical quad) and a short-term forecast of the sunspot number. Actual solar and geomagnetic activity will affect results observed.

The three regions cover stations within the following areas:

VK EAST The major part of NSW and Queensland

VK SOUTH Southern-NSW, VK3, VK5 and VK7.

VK WEST The south-west of Western Australia.

Likewise, the overseas terminals cover substantial regions (eg "Europe" covers most of Western Europe and the UK).

The sunspot number used to make these predictions is 65.8, next month's predicted value is 63.9.

VK EAST AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	9.0	10	7.2	0	-20	.	.	..
2	8.4	2	6.5	-1	-19	-39	.	..
3	8.1	-6	6.3	-2	-19	-38	.	..
4	11.2	0	8.7	3	-4	-16	-33	..
5	17.0	6	13.2	4	5	1	-7	-18
6	21.4	6	16.5	3	8	7	1	-7
7	20.0	6	15.0	3	7	5	-1	-10
8	17.5	7	13.1	6	6	2	-7	-19
9	14.5	6	10.9	6	3	-5	-18	-34
10	12.0	5	9.0	5	-3	-14	-32	...
11	10.1	4	7.6	3	-11	-27	.	.
12	9.1	6	6.9	1	-18	-36	.	.
13	8.7	14	6.4	0	-23	.	..	...
14	8.5	23	6.3	0	-27	.	.	.
15	8.7	27	6.4	1	-27	.	.	.
16	8.8	29	6.6	0	-26	.	..	..
17	8.4	31	6.4	-2	-34	.	.	.
18	8.3	31	6.3	-2	-35	.	.	.
19	8.2	32	6.2	-3	-35	..	..	...
20	8.0	32	6.2	-4	-37	.	.	...
21	8.8	31	6.7	0	-29	.	.	..
22	8.5	30	6.5	-2	-33	.	.	...
23	7.9	23	6.2	-6	-37	.	.	...
24	7.8	14	6.2	-6	-34	.	.	.

VK EAST EUROPE L/P

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	16.4	18	11.1	19	16	10	0	-10
2	15.4	19	10.5	20	15	6	-3	-16
3	14.5	21	9.9	21	14	5	-7	-22
4	13.9	26	9.5	25	14	4	-11	-28
5	13.9	24	9.6	24	14	4	-10	-27
6	14.7	24	10.2	25	15	6	-8	-24
7	14.9	21	11.3	22	13	3	-11	-28
8	12.8	15	9.5	13	3	-9	-26	.
9	10.7	5	7.9	5	-5	-17	-37	.
10	9.6	-4	7.1	1	-7	-20	-39	..
11	9.1	-14	6.7	0	-7	-18	-36	.
12	8.9	-20	6.5	0	-6	-16	-31	.
13	9.0	-31	6.7	-6	-9	-18	-34	.
14	9.2	-39	6.8	-10	-12	-20	-36	.
15	9.5	.	7.0	-14	-14	-21	-35	.
16	9.2	.	6.9	-20	-20	-28	.	.
17	8.5	.	6.5	-27	-28	-36	.	.
18	8.4	..	6.4	-26	-28	-39	..	.
19	10.0	-29	7.3	-7	-7	-13	-26	.
20	13.5	-6	10.4	-4	-1	-4	-12	-24
21	17.5	3	13.4	-2	3	2	-4	-12
22	18.9	10	13.0	6	10	9	3	-4
23	18.2	14	12.4	13	14	11	5	-4
24	17.3	16	11.8	17	15	11	3	-7

VK EAST SOUTH PACIFIC

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	27.5	23	20.7	35	35	33	28	21
2	27.3	24	20.5	35	35	33	28	21
3	27.1	24	20.4	37	36	33	28	21
4	26.6	25	20.0	39	37	34	28	20
5	24.9	26	18.8	42	38	34	26	18
6	22.4	30	17.0	46	39	33	23	12
7	19.3	32	14.6	45	36	27	15	1
8	16.5	35	12.4	42	30	18	3	-12
9	14.1	36	10.6	37	22	8	-9	-29
10	12.6	39	9.5	33	16	0	-20	.
11	11.8	40	8.8	30	11	-5	-28	.
12	11.2	41	8.4	28	8	-9	-34	.
13	10.9	41	8.1	27	8	-12	-37	.
14	10.8	41	8.1	26	8	-12	-38	.
15	11.0	41	8.3	27	7	-11	-36	.
16	10.3	42	7.8	24	2	-18	.	.
17	9.0	44	6.9	16	-8	-33	.	.
18	8.7	44	6.7	14	-12	-36	.	.
19	11.6	40	9.0	29	10	-7	-30	.
20	17.0	32	13.2	38	29	19	5	-9
21	22.2	27	17.1	39	35	29	20	10
22	25.3	25	19.4	37	36	32	26	18
23	26.5	24	20.2	36	35	32	27	20
24	27.1	23	20.5	35	35	32	27	21

VK EAST ASIA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	25.5	11	19.4	11	17	16	12	6
2	24.9	11	19.4	10	16	15	11	5
3	24.8	11	18.9	9	16	15	11	5
4	25.1	11	19.4	10	16	16	12	5
5	25.7	11	19.6	12	18	17	13	6
6	24.9	12	19.0	15	19	17	12	5
7	23.0	13	17.6	20	20	16	9	0
8	20.5	16	15.6	25	21	14	3	-9
9	18.1	19	13.8	29	19	8	-7	-24
10	15.8	21	12.0	27	12	-2	-22	...
11	14.4	23	10.9	23	5	-12	-36	...
12	13.5	24	10.2	20	0	-20	.	.
13	12.8	25	9.7	18	-5	-26	.	.
14	12.4	25	9.5	15	-8	-31	.	...
15	11.9	25	9.1	13	-12	-37	.	.
16	11.9	25	9.1	13	-12	-37	.	..
17	10.8	26	8.3	5	-25	.	.	..
18	8.9	28	6.9	-13	.	.	.	.
19	8.5	28	6.6	-19	.	.	.	.
20	11.5	27	8.9	13	13	-36	.	..
21	15.5	21	12.1	25	12	-1	-20	.
22	22.3	16	17.2	23	22	15	10	0
23	25.5	13	19.8	18	21	19	14	7
24	25.7	12	19.7	14	19	18	13	7

VK EAST MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	15.6	8	11.8	8	7	3	-5	-17
2	15.9	2	11.9	-1	4	1	-5	-15
3	18.5	2	13.7	-8	2	3	0	-6
4	21.6	4	16.3	-13	1	4	4	0
5	23.2	5	17.9	-17	0	4	5	2
6	23.5	5	18.4	-17	0	4	5	2
7	23.9	4	18.1	-14	0	4	3	0
8	21.5	4	16.3	-9	2	4	1	-4
9	18.5	3	14.0	-3	3	2	-3	11
10	15.8	3	12.0	1	3	-1	10	-22
11	13.6	3	10.3	4	1	-7	-20	-38
12	12.2	5	9.2	6	-1	12	-30	.
13	11.5	10	8.6	8	-4	-18	-39	.
14	11.0	16	8.3	9	-7	-24	.	.
15	10.8	22	8.2	11	-8	-28	.	...
16	10.8	26	8.1	12	-9	-30	.	..
17	11.0	27	8.3	14	-8	-29	.	.
18	10.3	29	7.8	10	-14	37	.	.
19	9.0	31	6.9	2	-28	.	.	...
20	8.7	31	6.7	0	-31	.	.	.
21	11.4	29	8.6	16	-4	25	.	.
22	13.4	27	10.4	24	10	-4	-24	.
23	12.9	19	9.9	17	5	-7	-26	.
24	16.6	14	12.7	15	13	7	-3	-16

VK EAST USA/CARIBBEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	24.9	7	19.7	-8	5	8	7	4
2	24.1	10	19.4	0	10	11	9	5
3	22.8	15	18.3	11	16	16	12	6
4	21.6	18	17.2	22	22	19	13	5
5	20.8	22	16.5	31	27	21	13	4
6	20.1	24	15.9	35	28	[illegible]	11	0
7	19.2	21	14.6	34	24	15	2	12
8	16.5	24	12.5	31	18	6	-10	-28
9	14.2	26	10.7	26	10	-[illegible]	-25	.
10	12.8	27	9.6	22	3	14	36	.
11	12.0	28	9.0	16	1	-21	.	.
12	11.4	29	8.5	16	-5	-26	.	.
13	11.0	26	8.3	13	-8	26	.	.
14	10.9	18	8.2	9	-8	-27	.	.
15	11.0	12	8.3	7	-7	-23	.	.
16	10.1	2	7.7	2	-10	-26	.	.
17	8.7	11	6.7	2	15	31	.	.
18	8.4	-20	6.5	-2	-13	-28	.	.
19	11.3	-10	8.8	-2	-5	13	27	.
20	16.8	0	13.0	-6	0	1	-8	17
21	21.9	3	16.8	12	0	3	1	-4
22	24.3	4	18.9	-15	0	4	4	0
23	24.8	5	19.5	15	0	5	5	2
24	24.9	6	19.7	-13	2	6	6	3

VK SOUTH AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	9.0	22	6.9	3	-21	...	...	...
2	8.7	14	6.7	0	-22	...	...	...
3	11.8	14	8.7	11	-2	-16	-37	...
4	17.6	13	13.6	16	13	6	-5	-18
5	21.0	10	17.0	11	13	9	2	-7
6	22.6	9	18.2	9	12	10	5	-3
7	21.4	8	17.1	8	11	9	2	-6
8	19.3	9	15.4	9	10	6	2	13
9	16.7	9	13.2	10	7	0	-11	25
10	13.9	9	10.9	8	1	-6	-24	...
11	11.6	9	9.1	6	-6	-20	...	...
12	9.6	10	7.6	2	16	36	...	...
13	9.0	14	6.9	-1	24	...	...	...
14	8.6	22	6.6	-3	-31	...	...	...
15	8.7	26	6.7	-2	-32	...	...	...
16	8.9	28	6.8	0	-30	...	...	...
17	8.9	30	6.8	0	-30	...	...	...
18	8.9	31	6.8	1	29	...	...	...
19	8.7	30	6.8	1	33	...	...	...
20	8.3	31	6.5	-6	...	...	...	...
21	8.2	31	6.4	-6	...	...	...	...
22	9.0	31	7.0	1	-28	...	...	...
23	8.4	31	6.6	-2	-34	...	...	...
24	8.3	27	6.6	-3	-34	...	...	...

VK SOUTH SOUTH PACIFIC

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	20.2	14	15.2	23	18	11	0	13
2	20.8	14	15.6	24	20	13	2	-10
3	20.9	14	15.6	25	21	14	2	-10
4	20.3	16	15.4	27	21	13	1	-12
5	18.3	18	13.9	28	19	8	-8	-23
6	15.9	23	12.0	29	14	0	-21	...
7	13.6	26	10.3	23	3	-15	...	...
8	11.7	29	8.8	15	-10	-33	...	...
9	10.0	31	7.5	4	-27	...	...	...
10	9.0	32	6.7	4	...	...	...	...
11	8.1	33	6.1	14	...	...	...	...
12	7.7	34	5.7	-20	...	...	...	...
13	7.6	34	5.6	-22	...	...	...	...
14	7.7	34	5.7	-20	...	...	...	...
15	7.9	34	5.9	-17	...	...	...	...
16	7.3	35	5.6	24	...	...	...	...
17	7.1	35	5.5	28	...	...	...	...
18	7.2	35	5.6	-27	...	...	...	...
19	7.1	33	5.5	-29	...	...	...	...
20	8.6	25	6.7	-9	...	...	...	...
21	11.5	19	8.9	9	-12	-33	...	...
22	14.8	16	11.4	18	5	-8	-28	...
23	17.4	15	13.3	21	13	3	-11	-29
24	19.0	14	14.4	22	16	8	-4	-19

VK WEST EUROPE L/P

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	14.9	5	10.4	4	5	1	-7	-18
2	14.6	9	9.9	9	6	0	-11	24
3	13.4	11	9.5	11	5	-2	-15	30
4	12.9	14	9.2	13	5	-4	-18	34
5	13.1	15	9.4	14	6	-3	-17	-33
6	13.8	16	9.9	16	8	0	-13	-28
7	14.8	16	10.8	16	11	3	-8	-21
8	16.0	14	11.6	15	10	3	7	-21
9	14.2	10	11.6	10	3	-5	-20	-36
10	11.8	2	9.1	3	-4	-15	-31	...
11	9.9	-7	7.6	1	-9	-21	-39	...
12	9.0	-16	6.9	-2	10	-21	-39	...
13	8.8	-31	6.5	-8	14	25	...	...
14	8.5	...	6.5	-17	-23	34	...	...
15	8.7	...	6.6	-25	-28	38	...	...
16	8.8	...	6.7	-31	-32	...	...	...
17	9.0	...	6.9	-36	-35	...	...	...
18	8.7	...	6.7	...	...	...	...	...
19	8.1	...	6.3	...	...	...	...	...
20	8.0	...	6.3	...	...	...	...	...
21	9.3	...	7.0	-26	26	34	...	...
22	11.9	16	9.5	-7	-4	-9	18	-30
23	15.2	4	11.8	-7	-2	-4	-11	-21
24	15.6	0	11.0	-2	2	0	-5	-14

VK SOUTH ASIA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	21.5	9	16.3	8	12	9	3	-5
2	22.1	9	16.9	7	12	10	5	-2
3	22.3	10	16.9	8	12	11	6	-1
4	22.8	9	17.2	8	12	11	6	-1
5	22.6	10	17.0	8	13	11	6	-2
6	21.7	10	16.4	11	14	11	4	-4
7	19.9	11	15.0	14	13	8	0	-12
8	17.8	13	13.3	18	12	3	-10	-26
9	14.7	17	11.1	19	4	-10	-32	...
10	12.3	20	9.3	11	-11	-33	...	...
11	10.4	22	7.8	-1	-33	...	...	...
12	9.3	24	7.0	-12	...	...	...	...
13	8.8	25	6.6	19	...	...	...	...
14	8.5	26	6.4	-22	...	...	...	...
15	8.6	26	6.4	-22	...	...	...	...
16	8.8	25	6.6	-19	...	...	...	...
17	9.0	25	6.8	-16	...	...	...	...
18	8.7	25	6.6	21	...	...	...	...
19	7.9	26	6.1	33	...	...	...	...
20	7.7	26	6.0	36	...	...	...	...
21	9.6	25	7.5	-8	...	...	...	...
22	13.4	11	10.4	10	-3	-19	...	...
23	17.3	10	13.3	12	8	1	-11	-26
24	20.1	9	15.4	10	12	6	0	-11

VK SOUTH USA/CARIBBEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	26.4	8	20.5	-5	7	10	9	5
2	25.9	11	19.7	4	13	14	12	7
3	24.2	15	19.4	16	20	19	14	8
4	22.6	20	18.1	27	25	22	15	8
5	21.8	20	16.9	33	28	22	13	2
6	19.7	21	14.8	33	25	17	5	-6
7	16.3	24	12.2	30	18	8	-10	-26
8	13.5	26	10.0	24	7	-6	-30	...
9	11.2	29	8.4	15	-6	-27	...	...
10	10.1	30	7.5	9	-16	...	...	...
11	9.5	30	7.0	5	-22	...	...	...
12	9.3	30	6.8	4	-24	...	...	...
13	9.4	27	7.1	4	-22	...	...	...
14	9.7	18	7.2	4	-17	-36	...	...
15	10.0	10	7.4	4	-13	-31	...	...
16	9.7	1	7.3	1	-12	-29	...	...
17	8.9	-9	6.6	-1	-13	-29	...	...
18	8.8	-16	6.7	-1	-11	-25	...	...
19	10.7	-11	7.8	-1	-5	-14	-30	...
20	14.6	-3	11.3	-4	0	-4	-13	-25
21	19.0	2	14.5	-8	1	1	-2	-10
22	22.4	4	17.0	-12	1	4	2	-2
23	24.3	5	18.4	-13	1	5	4	1
24	25.7	6	19.3	-11	3	7	7	3

VK WEST MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	14.4	20	10.9	20	10	-1	-17	-36
2	14.5	11	10.9	11	6	-1	-15	-31
3	17.0	7	13.4	4	6	3	-5	-16
4	19.9	6	15.1	-1	5	6	2	-5
5	21.4	6	16.5	-6	5	6	3	-2
6	21.6	5	17.0	-8	3	5	3	-1
7	22.1	5	17.6	-9	3	5	3	-1
8	22.6	4	17.2	-8	3	5	2	-3
9	21.1	4	18.0	-5	3	4	0	-7
10	18.6	4	14.5	0	4	2	-4	-14
11	16.0	4	12.1	8	3	-2	-13	-27
12	13.5	5	10.2	6	-1	-11	-27	...
13	11.5	7	8.7	4	-8	-23	...	...
14	10.3	12	7.8	3	-16	-36	...	...
15	9.7	19	7.3	1	-23	...	...	...
16	9.4	24	7.1	0	-29	...	...	...
17	9.4	26	7.2	0	-30	...	...	...
18	9.5	26	7.2	1	-29	...	...	...
19	9.7	28	7.4	3	-27	...	...	...
20	9.3	29	7.1	-1	-33	...	...	...
21	8.3	29	6.4	-10	...	...	...	...
22	8.1	30	6.2	-13	...	...	...	...
23	10.3	28	7.7	6	-21	...	...	...
24	11.7	26	9.0	17	-3	-23	...	...

VK SOUTH EUROPE L/P

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	15.4	15	10.7	15	12	6	-3	-15
2	14.5	16	10.1	16	12	4	-7	-22
3	13.8	21	9.6	20	12	2	-12	-28
4	13.3	26	9.4	24	12	0	-16	-34
5	13.4	25	9.5	24	12	1	-15	-33
6	14.2	24	10.1	24	14	4	-10	-26
7	14.3	19	11.0	20	8	-3	-20	...
8	11.9	14	9.3	10	-2	-16	-36	...
9	10.0	6	7.6	3	-10	-25	...	...
10	9.1	-3	7.0	0	-12	-28	...	...
11	8.7	-10	6.7	0	-11	-25	...	...
12	8.7	-16	6.6	0	-9	-21	...	...
13	8.8	-20	6.8	-6	-13	-24	...	...
14	8.9	...	6.8	-14	-19	-30	...	...
15	9.1	...	7.0	-21	-24	-34	...	...
16	8.8	...	6.8	-31	-33	...	...	...
17	8.2	...	6.4	...	...	...	...	...
18	8.1	...	6.4	...	...	...	...	...
19	9.4	...	7.1	-29	-29	-37	...	...
20	11.9	-15	9.5	-6	-2	-6	-14	-26
21	15.3	-5	12.3	-6	-1	-2	-8	-17
22	17.7	1	12.4	-7	1	1	-3	-10
23	17.0	5	11.9	0	6	5	0	-7
24	16.2	10	11.3	9	10	6	-1	-11

VK WEST AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	8.3	26	6.4	-2	-33	...	...	...
2	8.2	17	6.3	-3	-30	...	...	...
3	11.5	14	8.6	9	-4	-20	...	...
4	17.5	13	13.6	16	12	5	-6	-20
5	21.5	10	16.4	11	13	10	3	-6
6	23.2	9	17.6	8	13	11	6	-2
7	23.5	8	17.6	7	12	11	6	-2
8	22.3	8	16.7	7	11	9	3	-4
9	20.2	8	15.1	8	10	7	0	-10
10	17.6	9	13.2	10	9	3	-7	-20
11	14.6	11	10.9	11	4	-5	-20	-36
12	12.1	12	9.0	9	-3	-17	-36	...
13	10.1	17	7.6	6	-14	-34	...	...
14	9.2	24	6.8	2	-24	...	...	...
15	8.7	28	6.4	0	-30	...	...	...
16	8.6	30	6.3	-1	-32	...	...	...
17	8.7	32	6.5	0	-31	...	...	...
18	8.9	32	6.6	2	-29	...	...	...
19	8.8	32	6.5	2	-29	...	...	...
20	8.9	32	6.6	1	-29	...	...	...
21	8.3	33	6.3	-3	-37	...	...	...
22	8.1	33	6.3	-4	-39	...	...	...
23	9.2	32	7.0	4	-24	...	...	...
24	8.5	33	6.5	-1	-33	...	...	...

VK WEST SOUTH PACIFIC

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	23.4	11	17.7	18	17	15	8	0
2	24.8	11	18.8	18	18	16	10	3
3	25.8	11	19.7	17	20	17	12	4
4	25.8	11	19.2	18	21	18	13	5
5	24.3	13	18.3	23	22	19	11	2
6	21.8	18	16.5	29	24	18	8	-3
7	18.8	20	14.2	31	22	12	0	-16
8	16.0	24	12.1	29	18	4	-13	-33
9	13.6	27	10.3	25	8	-7	-29	...
10	11.5	30	8.6	18	-3	-23	...	...
11	10.3	32	7.7	13	-12	-36	...	...
12	9.7	33	7.2	9	-18	...	...	...
13	9.3	34	6.9	8	-23	...	...	...
14	9.1	34	6.7	5	-25	...	...	...
15	9.2	34	6.9	6	-23	...	...	...
16	9.5	33	7.0	8	-20	...	...	...
17	8.8	35	6.7	3	-28	...	...	...
18	8.5	35	6.5	1	-31	...	...	...
19	8.7	34	6.7	2	-28	...	...	...
20	8.7	26	6.7	0	-26	...	...	...
21	10.5	20	7.7	9	-11	-31	...	...
22	14.2	17	10.9	17	6	-8	-24	...
23	18.3	14	14.0	18	14	7	-4	-16
24	21.5	12	16.4	16	17	12	4	-5

VK SOUTH MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	15.5	14	11.8	15	11	4	-7	-21
2	15.6	7	11.8	5	6	2	-7	-19
3	18.4	5	14.5	2	5	4	0	-6
4	21.7	6	16.5	9	3	6	4	0
5	23.4	6	18.0	-13	2	6	5	2
6	23.6	5	18.5	-14	1	5	5	2
7	24.1	4	18.1	13	1	4	4	0
8	21.9	4	16.4	9	2	4	2	-3
9	19.1	3	14.3	4	3	2	-2	-10
10	15.8	2	11.9	0	2	-2	-11	-23
11	13.1	1	9.8	2	-1	-9	-23	...
12	10.9	1	8.2	2	-7	-20	...	...
13	9.8	5	7.3	1	-14	32	...	...
14	9.3	12	6.9	0	-20	...	...	...
15	9.2	20	6.8	0	25	...	...	...
16	9.3	25	6.8	1	-26	...	...	...
17	9.6	27	7.1	4	-23	...	...	...
18	9.8	29	7.4	6	-21	...	...	...
19	9.5	29	7.2	4	-24	...	...	...
20	8.9	30	6.8	-1	-33	...	...	...
21	8.7	30	6.7	-2	-35	...	...	...
22	10.5	28	8.2	10	14	38	...	...
23	10.7	26	8.3	12	10	-32	...	...
24	14.7	20	11.1	21	10	-1	-18	-37

VK WEST ASIA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	24.7	12	19.0	15	19	17	12	4
2	25.3	12	19.4	13	18	17	12	6
3	24.7	13	19.1	11	17	16	12	6
4	24.5	12	18.8	10	16	16	12	5
5	24.7	13	19.1	11	17	16	12	6
6	25.4	12	19.4	13	18	17	13	6
7	25.3	12	19.3	18	20	18	13	6
8	24.1	13	18.4	20	21	18	12	3
9	21.9	15	16.7	25	22	17	7	-3
10	19.2	20	14.5	34	23	13	-1	-18
11	16.6	21	12.7	30	15	1	-18	-39
12	14.3	22	10.9	23	3	-15	...	...
13	13.0	23	9.9	17	-5	-28	...	...
14	12.1	24	9.2	12	-14	-39	...	...
15	11.6	24	8.8	8	-20	...	...	...
16	11.3	24	8.6	6	24	...	...	...
17	11.1	24	8.4	4	-26	...	...	...
18	11.2	24	8.5	5	25	...	...	...
19	10.3	25	7.9	-2	-37	...	...	...
20	8.8	25	6.8	-20	...	...	...	...
21	8.5	26	6.6	-25	...	...	...	...
22	11.5	18	8.7	5	-19	...	...	...
23	17.1	14	13.3	19	11	1	-13	-31
24	22.1	13	17.0	18	18	14	6	-3

VK WEST USA/CARIBBEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	24.0	6	18.2	-14	1	5	5	2
2	23.8	9	19.1	-9	5	9	8	5
3	22.6	12	18.1	0	10	12	11	6
4	21.4	15	17.0	9	15	15	11	6
5	20.6	18	16.3	18	20	18	12	4
6	19.9	23	15.7	27	25	20	13	3
7	19.0	26	15.4	33	28	21	12	1
8	17.9	27	14.0	35	26	18	6	-7
9	16.0	28	12.0	31	19	8	-8	...
10	13.2	29	9.9	25	9	-6	-28	...
11	11.1	31	8.3	17	-4	-24	...	...
12	9.9	32	7.4	11	13	-37	...	...
13	9.4	30	7.0	8	18	...	...	...
14	9.1	19	6.8	5	-17	-39	...	...
15	9.3	12	7.0	5	-13	-33	...	...
16	9.6	4	7.2	4	-9	-25	...	...
17	9.9	-2	7.5	3	-8	-19	-39	...
18	9.6	-9	7.3	2	-5	-17	-35	...
19	8.9	19	6.8	1	-5	-17	-34	...
20	8.8	-34	6.7	-5	11	21	39	...
21	10.7	-17	7.9	-2	1	-8	20	35
22	14.8	-5	11.4	-7	0	-1	-8	-17
23	19.1	1	14.6	-13	0	2	0	-6
24	22.3	4	17.0	-16	0	3	3	0

HAMADS

TRADE ADS

● AMIDON FERROMAGNETIC CORES: For all RF applications. Send business size SASE for data/price to RJ & US Imports, PO Box 431, Kiama NSW 2533 (no enquiries at office please .. 14 Boanyo Ave Kiama). Agencies at Geoff Wood Electronics, Sydney: Webb Electronics, Albury: Assoc TV Service, Hobart: Truscotts Electronic World, Melbourne.

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FOR SALE ACT

● YAESU FT 747-GX $800; MFJ Versatuner III, MFJ 962C $300; DRAKE SSR1 comm Rx $450; RTTY converter home brew, $50; NATIONAL Panasonic tape recorder $50; TRIO-KENWOOD oscilloscope 15 MHz. $300; G4PMK SPECTRUM Analyser, home brew, $50; RF Sig Gen $100; ICOM IC22 VHF FM, xtals for Packet, $100; DICK SMITH UHF Explorer $100, KENWOOD KP202 2 m FM hand held, $200. Chris VK1DO (06) 290 1448 A Hrs.

● KENWOOD TS530S HF xcvr s/n 2040358 with hand mic, instr manual, orig pkg, exc cond, has had well below average use, $600. Warwick VK1AWH QTHR (06) 286 4232.

● ICOM IC730 HF xcvr and hand mic, good cond, w/s manual, exc mobile/first rig, s/n 01923, $550; YAESU FT102 HF xcvr, good cond spare finals, hand and desk mics, s/n 081036, $700. Both items ONO. Richard VK1RJ, QTHR (06) 258 1228.

FOR SALE NSW

● ICOM IC730 HF xcvr, exc cond, never been mobile, s/n 03700, $650 ONO, VK2ELS QTHR (02) 875 2958.

● YAESU FTV-700, 70 cm/10 m transverter, ALC amp s/n 3M02006 & P3M090026. Cables, Manual, orig carton, purchase docs, $350-00. Hans VK2AOU QTHR (02) 539789.

● YAESU FT 212RH 2m 45w mobile xcvr with 5/8 ant, EC, s/n 2D890338, $400. Paul, VK2PAU 1 Blaxland Pl, Glenhaven NSW

● YAESU FT200 wkg order but needs some attention, suit restorer or useful for spares, $150; DSE EXPLORER 70cm FM xcvr, VGC, S/N 6300338, $150. Peter VK2BEU QTHR (02) 872 3381.

● ICOM IC 735 HF xcvr, c/w mic, manual and access, $1000; ICOM PS55 PSU $400. YAESU FT7B HF xcvr $500; YAESU FL2000B HF linear amp, $1000; KATSUMI 150 iambic keyer $200. Elsie (047) 741 084.

● HEWLETT PACKARD VTVM model 410B, DC to 1000V, AC to 300 V, to 700 MHz, as new with manual, $149. VK2CPK (02) 605 4790.

FOR SALE VIC

● EIMAC 3-500Zs (pair), as new, used sparingly, $195. Roth VK3BG (03) 725 3550.

● SCHEMATIC/PCB program, suit most requirements, incl auto place, auto route and auto transfer from schematic to PCB, complete with orig manuals, professional package, $250-00. VK3XBA (03) 872 3411

● KENWOOD TS520 and extension spkr, full serv man, $550; Set of YAESU mobile whips 3.5, 21, 28, 144 MHz, $30. VK3SM (03) 386 4406.

● COLLINS HF receivers, rare 51S1 exc cond, $1100; 390A HF, exc cond, $950, 51J4 Rx, exc cond, $400. All GWO with instr books, Rob VK3JE (060) 371262 or (03) 584 5737.

● DECEASED ESTATE of the late VK3WT. YAESU FT101Z with digital dial fitted, exc cond, $500; TRIO comm Rx, model JR60, $100, NALLY tower, tilt over, two section, complete with rotator and triband HF beam, buyer to remove, exc cond, $1000, KEN KP202 2m handheld, $50; also SWR meter, GDO, headphones etc. Contact Trevor (03) 726 0831

● EXPANDED SCALE voltmeter, lead-acid cell tester 1.8V 2.8V, master instruments type CT74, $20 posted Terry VK3ZXY QTHR (03) 592 3514.

● AWA VHF low band xcvr, 2 ch xtal cont FM mode, valve construction, operates off 12 VDC, with cct diag, suitable for 6m conversion, no xtals, $25; REALISTIC SCANNER pro2010, covers 8 bands, 68-88 MHz, 118-136 MHz, 148-174 MHz, 380-450 MHz, 450-470 MHz, 470-512 MHz, AM/FM full scan facilities, 20 mem ch, op manual, 240 VAC desktop model, VGC, $350; VHF xcvr valves 6BH6, 6AU6, 6AK5, 6AK6, 12AX7, 12AT7, EC4, 6C4, 6T6, 6AJ8, 6BD, 1U5, above $5 ea. Tx valves QQE03/12, $14 ea. Suitable as spares or replacements. Vincent VK3AJO QTHR (03) 872 3503 A Hrs.

● AMPLIFIER Hybrid Public address with two dynamic mic and aux inputs, 50 w output, box three spkrs, $100. VK3DPO QTHR (03) 857 5342

● SATELLITE Rx kU band NEC 1022a, exc for receiving Aussat or 10 GHz and 1.2 MHz FM ATV experimentation (requires simple sound board, cct supplied), $75; PLESSEY 12A LNC $15; Low noise Maspro LNC 1.5 dB, $35. Neil VK3BCU (03) 390 2609.

● ICOM IC 701 xcvr with matching PSU, SM2 Desk mic, ICOM Hand mic, DC pwr lead (unused), 24 pin outlet plug with pins (unused), IC EX2 extension terminal with 100 kHz marker, dual acc outlets, headphone jack and linear cont relay (plugs into 701), manuals, ccts for all with collected info, as new cond, upgraded station, $1200 complete, HALLICRAFTERS rx mod S38A, 1.6 — 30 MHz in 4 bands, sep bandspread dial, 110 V, black metal case with inbuilt spkr, $200. VK3DS QTHR (053) 323 226 evenings.

FOR SALE QLD

● KENWOOD xcvrs, valves, Bird 43 pwr meters, ICOM xcvrs, CBs, and access. Test equipt, coax cable, bits and pieces. Location Lot 2 Markwell rd, Caboolture QLD 17th July 1993 (Food) 8.00 am (Contact Redcliffe repeater), Fred VK4DY (074) 961186.

● KENWOOD R820 comm rx, digi read out, IF shift, notch, PBT, matches TS820/TS520, VGC, $500 ONO; YAESU FR8800 gen cov rx, 2-30 MHz, incl FM, band scan, memories etc, exc cond, $800. Steve VK4KHQ 018 743 231, or inspect at 59 Albion Road, Albion Brisbane during office hours.

● ICOM IC-720 xcvr, incl PSU, new "Hamtenna" multiband vert ant, manual, $850. Selling as returning to G4. VK4CAF QTHR (070) 536 492.

WANTED NSW

● YAESU transverter FTV 901 or FTV 107 in good wkg cond. Richard VK2CRB (02) 548 1451 A Hrs or (02) 874 0122 Bus Hrs.

● MILITARY RADIOS AR-17, 108, 1009, 208, 11, 19, 22, B-40, R 1155, T 1154, Hall crafters S-27 and/or S-27D. CIRCUIT diags and/or manuals for the above sets and B-41 Rx, 62 set. University Super Tracer — AST, ACE Radio wideband oscilloscope, AWA gated amp type A55765 and AEI HV PSU tye R1103A. Photocopies OK. John Farmer (02) 888 9411 (BH/AH)

● SERVICE MANUAL or CCT diag for PCM FM3400 UHF repeater, all reas costs paid. Ian VK2AIJ QTHR (048) 232 562 (W), (048) 21 6806 (H)

WANTED VIC

● TWO EIMAC type HR-6 heat dissipating anode connectors, two EIMAC type SK-406 glass air system chimneys, and a KILOVAC vacuum relay with one c/over contact set. Details and prices to Roy, VK3ARY QTHR (03) 807 4798.

● SPECTRUM Analyser to around 1 GHz Peter VK3BPN QTHR (03) 580 9518 BUS, (03) 551 7346 A Hrs.

● OCTAL valves for vintage radio restorations. Types ECH33, EBF35, EL3N, EL33, fair prices paid Terry VK3ZXY QTHR (03) 592 3514

WANTED QLD

● ICOM IC202 2m, working or not Reas cond, David VK4DH QTHR (073) 789 868.

● ICOM IC211 or similar VHF multi mode set, cheap 20 MHz CRO or similar Tech books or manuals, valve data etc. VK4YFF (070) 317895 (Cairns).

● AC POWER CABLE or power plug to suit FT-101E. Keith VK4BKM QTHR (074) 86 4340.

WANTED WA

● INFORMATION, assistance, any help, hints, how to wind multi band whip antennas. Terry VK6NTJ QTHR. (Editor's Note: Terry, if all else fails, please refer to the WIA Divisional Bookshops advert in this issue, for information on books available in respect of this matter .. VK3UV, Production Editor).

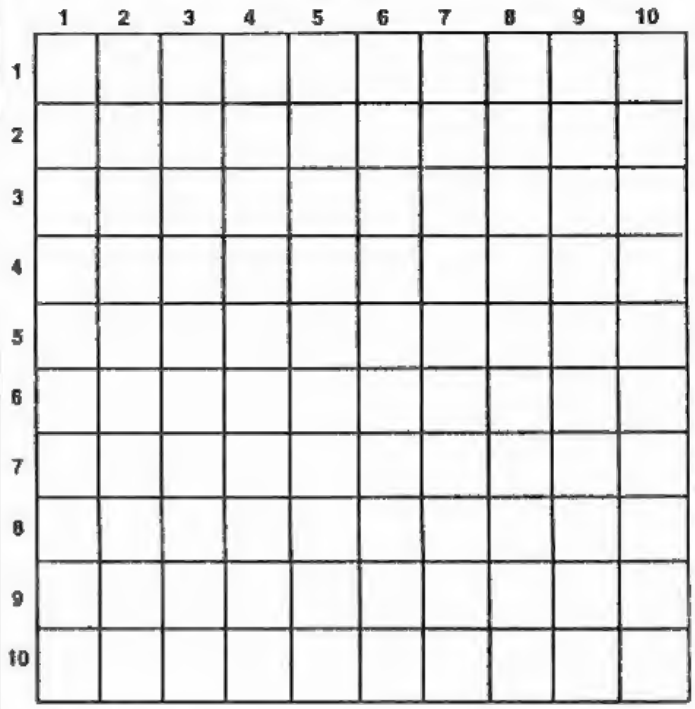
MISCELLANEOUS

● PLEASE SEND your donation of QSL cards, old or new, to the Hon Curator of WIA QSL Collection, 4 Sunrise Hill Road, Montrose Vic 3765, Tel (03) 728 5350. Let us save something for the future.

ar

Morseword 75

Solution Page 56



Across:
1 Memento
2 Akubras
3 Fish
4 Chairs
5 Outlook
6 Meetings
7 Slackened
8 Quagmire
9 Part of a church
10 Short yelp

Down
1 Dray
2 Submerge
3 Scottish dress
4 Sketched
5 Sovereign
6 Correct
7 Monster
8 Awkward
9 Stupid
10 Reason

Entries for 1994 Call Book close 31st July.

Is your current entry correct?

Hamads

Please Note: If you are advertising items For Sale and Wanted please use a separate form for each. Include all details; eg Name, Address, Telephone Number (and STD code), on both forms. Please print copy for your Hamad as clearly as possible.
•Eight lines per issue free to all WIA members, ninth line for name and address Commercial rates apply for non—members. Please enclose a mailing label from this magazine with your Hamad.
•Deceased Estates: The full Hamad will appear in AR, even if the ad is not fully radio equipment.
•Copy typed or in block letters to PO Box 300, Caulfield South, Vic 3162, by the deadline as indicated on page 1 of each issue.
•QTHR means address is correct as set out in the WIA current Call Book.

•WIA policy recommends that Hamads include the serial number of all equipment offered for sale.
•Please enclose a self addressed stamped envelope if an acknowledgement is required that the Hamad has been received.
Ordinary Hamads submitted from members who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re—sold for merchandising purposes.
Conditions for commercial advertising are as follows: $25.00 for four lines, plus $2.25 per line (or part thereof) Minimum charge — $25.00 pre—payable.

State: .....

Not for publication: ❑ Miscellaneous ❑ For Sale ❑ Wanted

Name:..... Call Sign: ..... Address: .....

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CONTRIBUTIONS TO AMATEUR RADIO

Amateur Radio is a forum for WIA members" amateur radio technical experiments, experiences, opinions and news. Manuscripts with drawings and/or photos are always welcome and will be considered for possible publication. Articles on computer disk are especially welcome. The WIA cannot assume responsibility for loss or damage to any material. "How to Write for Amateur Radio" was published in the August 1992 issue of AR. A photocopy is available on receipt of a stamped, self addressed envelope.

BACK ISSUES

Available only until stocks are exhausted. $4.00 to members, which includes postage within Australia.

PHOTOSTAT COPIES

When back issues are no longer available, photocopies of articles are available to members at $2.50 each (plus $2.00 for each additional issue in which the article appears).

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ADVERTISERS INDEX

HOW TO JOIN THE WIA

Fill out the following form and send to:

The Membership Secretary
Wireless Institute of Australia
PO Box 300
Caulfield South, Vic 3162

I wish to obtain further information about the WIA.

Mr, Mrs, Miss, Ms:.....

.....

Call Sign (if applicable):.....

Address:.....

.....

.....

State and Postcode:.....

WIA Morse Practice Transmissions

VK2BWI Nightly at 2000 local on 3550 kHz

VK2RCW Continuous on 3699 kHz and 144.950 MHz 5 wpm, 8 wpm, 12 wpm

VK3COD Nightly (weekdays) at 1030 UTC on 28.340 MHz and 147.425 MHz

VK3RCW Continuous on 144.975 MHz 5 wpm, 10 wpm

VK4WIT Monday at 0930 UTC on 3535 kHz

VK4WCH Wednesday at 1000 UTC on 3535 kHz

VK4AV Thursday at 0930 UTC on 3535 kHz

VK4WIS Sunday at 0930 UTC on 3535 kHz

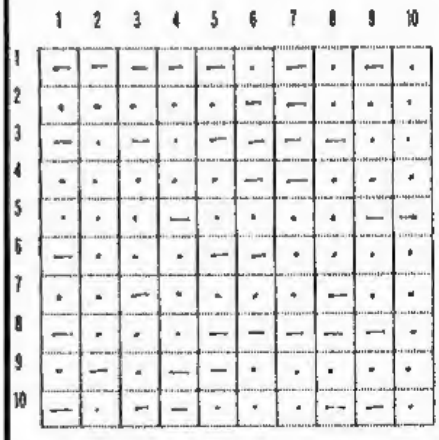
VK5AWI Nightly at 1030 UTC on 3550 kHz

VK6RAP Nightly at 2000 local on 146.700 MHz

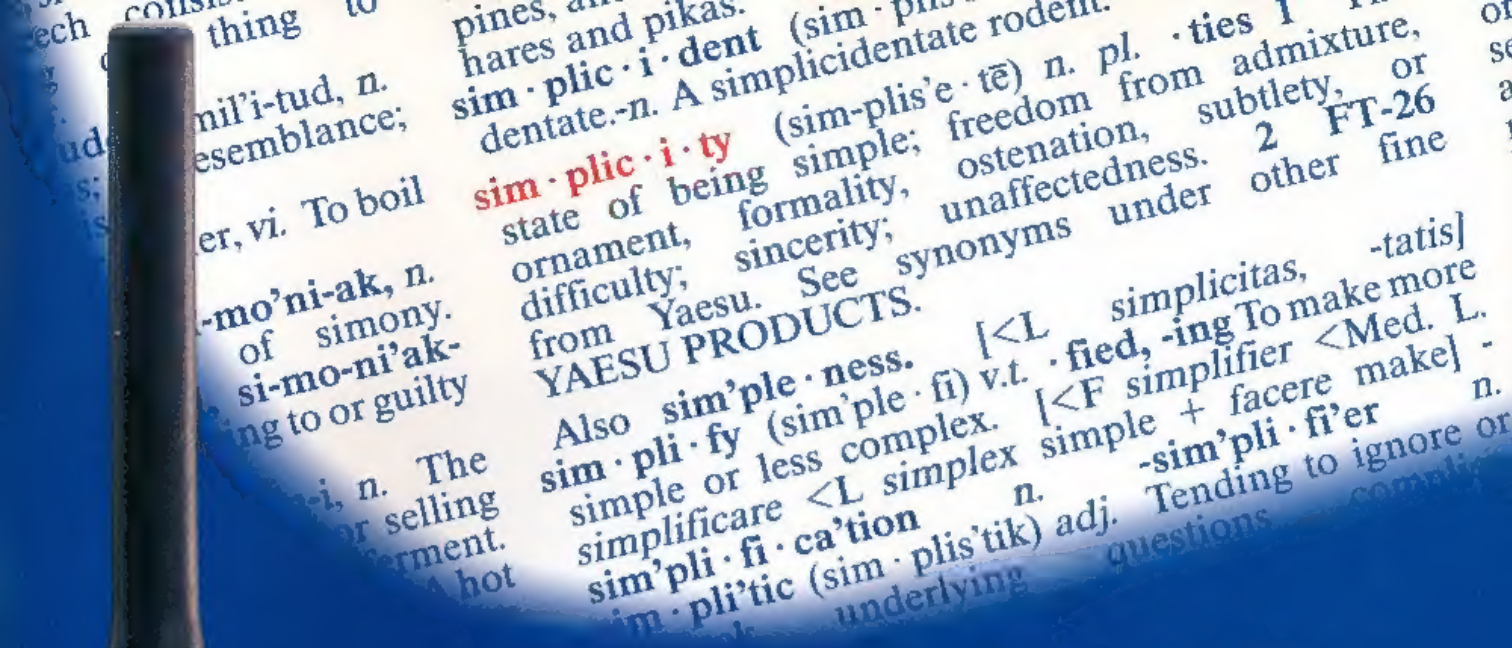
VK6WIA Nightly (except Saturday) at 1200 UTC on 3.555 MHz

Solution to Morseword 75

Page 55



Solution to Morseword 75
Across: 1 Token; 2 Hats; 3 Cod; 4 Seats; 5 View; 6 Dates; 7 Eased; 8 Bog; 9 Apse; 10 Yip.
Down: 1 Cart; 2 Dive; 3 Kilt; 4 Drew; 5 King; 6 Amend; 7 Ogre; 8 Inept; 9 Daft; 10 Sense.



Simplicity.

Why complicate your life when the simple things work so well? The new FT-26 from Yaesu is an excellent example of an easy to use, comfortable to hold, yet highly functional 2m handheld which you'll love to own. The specially designed Australian version microprocessor provides all the specialised features you'll ever need, yet keeps many 'set and forget' functions in the background where they belong. What's more, well laid out controls, rugged polycarbonate and diecast casings and a low distortion speaker ensures you'll enjoy using your FT-26 for many years to come.

- 144-148MHz transceive operation (better than 0.158uV sensitivity, 2W RF output), with highly sensitive wideband receiver coverage (130-174MHz) as standard!
- Custom microprocessor provides Australian version Auto Repeater Shift (ARS) for the easiest repeater operation, plus 53 tunable memories and 6 selectable tuning steps.
- A concise instruction manual with photographs and diagrams which takes you through all areas of operation.
- Each FT-26 comes with a superb long-life 7.2V 700mA/H NiCad pack as standard!
- An external DC jack and inbuilt battery charge circuit allows direct 12V DC operation, and 5W output.
- Yaesu's unique Automatic Battery Saver monitors operating history and optimises the save duration to stretch your operation time.
- 3 selectable output power levels (4 on 12V) provide greater flexibility
- Inbuilt VOX circuitry allows hands free operation (with optional YH-2 headset)
- Inbuilt DTMF paging provides group or selective calling facilities
- Rubber gasket seals provide protection from the elements
- Backlit 6 digit LCD screen and illuminated front panel buttons for night time operation
- Complete with 700mA/H NiCad, beltclip, protective carry case, a carry strap, antenna and approved AC charger.
- Ultra Compact: 55(w) x 125(h) x 33(d)mm.

2 YEAR WARRANTY

Introductory Price

$399

Cat D-3600

YAESU

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IC-R7100

IC-R100

IC-R72

IC-R1

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